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Main Line Natural Gas Sales to Industrial Users

UNITED STATES DEPARTMENT OF THE INTERIOR

U.S. Bureau of Mines.

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Main Line Natural Gas Sales to Industrial Users

By Fay B. Dillard
Division of Petroleum and Natural Gas, Washington, D.C.

March 3, 1849

UNITED STATES DEPARTMENT OF THE INTERIOR
Kent Frizzell, Acting Secretary

Jack W. Carlson, Assistant Secretary—Energy and Minerals

BUREAU OF MINES
Thomas V. Falkie, Director

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MAIN LINE NATURAL GAS SALES TO INDUSTRIAL USERS

by

Fay B. Dillard[1]

ABSTRACT

This Bureau of Mines report reviews the disposition of natural gas as elivered to industrial consumers via main line sales. Salient information n main line, or direct, natural gas sales to industrial users is presented y State, standard industrial classification code (SIC), revenue, and type of ales for the years 1968 through 1973.

INTRODUCTION

This study was compiled from data reported by all domestic natural gas ompanies required to file with the Federal Power Commission annual reports of ain line natural gas sales to industrial users (FPC Form No. 2, pp. 519-520). n contracting for main line natural gas sales, the buyer and seller negiotate he price for such sales, which are not subject to direct regulation by the ederal Power Commission. However, the FPC may interest itself in whether the ales carry their share of the total pipeline costs. In some instances, State tility Commissions may regulate the prices in certain contracts.

The FPC in 1966 required the reporting natural gas companies to classify heir industrial sales between "field sales" and "transmission sales." The ata contained in this publication are solely transmission sales, defined by PC as those made from points along transmission lines not within gasfields r production areas. Additionally, the FPC requires that individual customer ales of 50,000 Mcf or more be reported separately. Sales of less than 0,000 Mcf are to be reported in total for each State and individual industrial ustomers are not identified.

The data contained in this publication are presented in four tables. The tandard Industrial Classification Code (SIC) was derived by using Moody's ndustrial Manual, the Standard Industrial Classification Manual, Standard & oor's Register and the Thomas Register of American Manufacturers. All two- igit SIC's in tables 1, 2, and 4 were estimated from these four publications.

Mineral specialist.

Table 1 presents the total volume and revenue for main line industrial gas sales for each company required to report on FPC Form No. 2. These sales are for 1968-73 and are shown in thousands of Mcf with corresponding revenue data for each of the years under review.

Table 2 shows main line industrial sales by two-digit customer SIC and State for each of the 6 years.

Table 3 summarizes the direct sales in 1972 and 1973 by State and type of sale, (firm, offpeak, interruptible, and not specified).

Table 4 is a detailed presentation of company and customer sales information with individual customer SIC's, type of sale, delivery point, consumption, and revenue. Gas sales are identified as either "interruptible (I)," "firm (F)," "offpeak (OP)," or "not specified (NS)."

All natural gas data presented here are in million cubic feet, except where otherwise indicated, based on a standard measurement of 14.73 psia, 60° F.

SUMMARY

In 1973 main line natural gas sales were made in 34 States, and 15 reported increases compared with 1972 data. However, these increases were more than offset by a noticeable decrease in sales for the remaining 19 States, which resulted in a 10.3-percent decrease for total main line natural gas sales in 1973. The average revenue per Mcf in 1973 rose in 32 of the 34 States reporting main line sales.

This publication offers an historic series for 1968-73. The Bureau of Mines plans to continue this series on an annual basis. Similar data prior to 1968 were compiled and published by the National Coal Association.

SIC CODES BY MAJOR INDUSTRY GROUPS AS SHOWN ON TABLES 1, 2 AND 4

SIC	
01	Agricultural production--crops
07	Agricultural services
10	Metal mining
13	Oil and gas extraction
14	Mining and quarrying of nonmetallic minerals, except fuels
15	Building construction--general contractors and operative builders
16	Construction other than building construction--general contractors
20	Food and kindred products
22	Textile mill products
23	Apparel and other finished products made from fabrics and similar materials
24	Lumber and wood products, except furniture
26	Paper and allied products
28	Chemicals and allied products
29	Petroleum refining and related industries
30	Rubber and miscellaneous plastics products
31	Leather and leather products
32	Stone, clay, glass, and concrete products
33	Primary metal industries
34	Fabricated metal products, except machinery and transportation equipment
35	Machinery, except electrical
36	Electrical and electronic machinery, equipment, and supplies
37	Transportation equipment
39	Miscellaneous manufacturing industries
40	Railroad transportation
45	Transportation by air
46	Pipelines, except natural gas
49	Electric, gas, and sanitary services
50	Wholesale trade--durable goods
72	Personal services
80	Health services
83	Social services
91	Executive, legislative, and general government, except finance
92	Justice, public order, and safety
94	Administration of human resources programs
96	Administration of economic programs
97	National security and international affairs

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf

SIC	1968	1969	1970	1971	1972	1973
ALABAMA-TENNESSEE NATURAL GAS CO.						
26	1,661	1,493	2,098	3,084	2,959	3,006
28	4,334	5,422	4,704	7,062	8,369	9,232
33	4,393	5,218	5,357	5,241	5,887	6,087
37	761	779	808	882	901	1,038
49	2,815	3,166	3,081	2,128	2,437	2,849
Total	13,964	16,078	16,048	18,397	20,553	22,212
ARKANSAS-LOUISIANA GAS CO.						
10	503	691	1,102	985	1,103	1,159
13	497	211	396	373	477	319
14	1,222	1,506	1,675	1,725	1,759	2,269
16	0	0	0	0	0	53
20	912	831	851	839	848	778
22	251	293	278	382	432	364
24	120	1,899	2,696	3,103	3,325	3,178
26	35,230	33,935	33,363	31,011	27,600	21,487
28	26,140	27,346	27,983	27,057	26,405	41,243
29	46,041	36,656	33,691	30,966	27,863	11,945
30	103	54	0	0	0	0
32	11,541	12,406	11,611	11,320	8,612	7,272
33	22,958	28,971	35,577	28,975	32,435	34,309
35	453	468	280	330	464	316
36	407	508	485	546	386	296
37	131	187	181	184	0	0
39	0	0	93	206	268	310
40	73	65	58	0	0	0
46	78	138	224	401	112	130
49	79,266	89,221	110,601	92,723	81,129	54,808
92	128	118	72	121	125	124
97	8,215	7,971	7,519	6,061	6,131	5,471
Unknown	1,222	1,056	1,190	1,369	1,593	1,495
Total	235,491	244,531	269,926	238,677	221,067	187,326
ARKANSAS-OKLAHOMA GAS CORP.						
80	97	155	123	NA	NA	0
83	0	0	0	NA	NA	115
97	73	83	61	NA	NA	74
Total	170	238	184	NA	NA	189
CARNEGIE NATURAL GAS CO.						
34	20,718	23,461	24,983	NA	NA	8,827
Total	20,718	23,461	24,983	NA	NA	8,827
CITIES SERVICE GAS CO.						
01	217	269	248	311	275	202
07	0	88	81	73	82	105
13	0	0	53	136	55	52
16	0	0	0	57	0	0

NA Not available

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
CITIES SERVICE GAS CO.--Continued						
20	252	215	154	243	240	211
26	51	0	0	0	0	54
28	18,992	25,189	24,995	27,646	30,505	31,052
29	32,772	26,325	19,733	16,982	13,218	11,817
30	1,597	1,804	1,660	1,914	1,824	1,741
32	15,420	14,862	13,622	13,579	14,189	13,624
33	1,302	1,468	1,416	1,401	1,256	1,214
35	712	720	719	694	732	735
37	1,734	1,814	1,664	1,559	1,512	1,190
46	1,064	1,003	1,084	1,026	1,052	1,036
49	50,760	68,805	73,144	84,762	87,412	83,099
92	600	676	598	595	535	543
94	169	182	170	180	174	153
97	3,160	3,381	3,447	3,085	2,597	1,766
Unknown	2,578	2,485	2,502	2,797	2,854	2,704
Total	131,380	149,286	145,290	157,040	158,512	151,298
COLORADO INTERSTATE CORP.						
13	12	47	148	171	111	48
20	1,049	1,218	1,402	1,352	1,285	1,361
32	14,776	15,678	15,441	16,179	16,731	15,368
49	22,595	25,479	24,166	31,774	32,179	26,492
91	8,336	9,231	9,600	9,282	9,689	9,739
Unknown	0	0	0	8	10	7
Total	46,768	51,653	50,757	58,766	60,005	53,015
CUMBERLAND ALLEGHENY GAS CO.						
26	744	606	434	0	0	0
28	111	109	112	0	0	0
32	234	173	173	0	0	0
Unknown	23	4	0	0	0	0
Total	1,112	892	719	0	0	0
EAST TENNESSEE NATURAL GAS CO.						
26	5,716	5,473	6,236	6,395	6,331	6,244
28	8,317	9,152	9,273	9,546	10,895	11,121
32	2,891	2,923	2,824	2,791	3,242	3,324
33	5,638	5,745	5,440	5,252	5,557	6,122
96	1,853	1,893	2,526	2,656	2,700	2,511
97	56	66	65	64	63	62
Total	24,471	25,252	26,364	26,704	28,788	29,384
EASTERN SHORE NATURAL GAS CO.						
20	508	384	588	388	377	165
28	2,239	2,271	1,930	2,216	2,275	2,197
29	1,105	1,137	1,453	1,121	877	1,089
30	251	211	182	214	242	152
91	831	1,007	932	886	479	337
Total	4,934	5,010	5,085	4,825	4,250	3,940

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Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
EL PASO NATURAL GAS CO.						
10	652	638	667	579	399	283
13	44	97	85	167	14	3
28	5,945	5,692	5,343	5,599	6,671	6,811
29	8,227	8,762	9,019	8,565	5,200	5,926
32	3,127	2,099	2,070	1,941	2,208	2,316
33	32,604	41,552	43,212	40,712	41,604	43,472
46	34	36	40	38	41	31
49	49,009	56,990	52,943	53,606	55,500	43,936
91	101	130	147	99	186	171
Unknown	3,891	3,880	4,044	4,659	4,522	4,477
Total	103,634	119,876	117,570	115,965	116,345	107,426
FLORIDA GAS TRANSMISSION CO.						
01	5	5	4	1	2	1
20	5,827	6,163	6,595	6,610	6,102	4,788
26	209	219	193	188	212	131
28	18,136	14,680	15,969	16,191	13,715	9,271
32	1,099	1,935	3,316	5,818	5,345	4,088
33	0	0	30	132	125	77
37	51	400	295	242	125	204
49	18,256	17,186	25,177	20,315	13,870	13,212
91	17,033	16,480	20,678	21,231	20,990	20,305
92	177	169	188	206	178	137
Unknown	27	32	5	2	0	3,862
Total	60,820	57,269	72,450	70,936	60,664	56,076
GAS TRANSPORT, INC.						
32	3,643	3,571	3,563	NA	NA	3,522
Total	3,643	3,571	3,563	NA	NA	3,522
GRANITE STATE GAS TRANSMISSION, INC.						
97	303	383	390	442	468	537
Total	303	383	390	442	468	537
INLAND GAS CO., INC.						
10	39	41	40	37	38	34
28	8,545	8,539	10,216	9,704	7,734	7,183
29	0	0	0	0	63	86
30	0	0	0	0	52	69
31	0	0	0	0	100	107
32	1,170	1,277	1,019	910	666	720
33	6,766	8,002	7,194	6,864	6,325	6,595
34	0	0	81	87	77	74
Unknown	76	77	189	271	61	80
Total	16,596	17,936	18,739	17,873	15,116	14,948

NA Not available.

Table 1. - Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
KANSAS-NEBRASKA NATURAL GAS CO.						
01	1,790	1,962	1,703	1,616	1,454	1,453
07	1,226	1,441	1,207	1,439	1,459	1,914
10	268	248	263	304	317	305
13	497	654	658	535	376	292
14	137	196	218	204	165	0
20	12,925	14,060	14,460	13,287	11,904	12,299
28	0	0	0	0	0	56
29	1,650	1,644	1,903	2,063	2,229	2,408
34	72	82	71	69	0	0
46	117	116	181	99	131	148
49	18,540	19,581	22,715	22,718	16,875	17,910
80	331	335	320	308	304	293
92	0	0	0	54	53	50
94	93	103	122	126	0	0
97	142	945	682	624	596	454
Unknown	1,696	1,256	1,299	1,145	935	545
Total	39,484	42,623	45,802	44,591	36,798	38,127
LONE STAR GAS CO.						
13	97	0	0	102	544	0
14	376	501	509	527	529	707
16	0	0	178	0	64	64
20	1,095	1,183	1,108	1,210	1,208	1,287
22	0	74	197	223	243	187
24	1,167	2,735	2,898	3,365	4,258	4,800
26	1,317	0	0	0	0	0
28	0	106	56	0	64	50
29	2,864	1,877	2,844	3,047	3,329	3,844
32	20,357	21,786	22,142	21,099	25,717	27,784
33	1,191	1,282	1,471	1,453	1,387	1,449
35	55	183	381	399	366	393
36	205	194	220	189	203	139
37	64	0	0	0	0	0
40	0	260	234	254	288	279
46	0	165	262	435	558	465
49	39,990	50,174	47,131	48,281	53,100	76,578
80	157	159	171	161	145	129
92	0	0	0	0	0	71
94	0	133	127	112	114	117
97	2,408	1,989	2,111	1,846	1,846	1,818
Unknown	2,349	2,646	2,514	3,115	23,915	3,085
Total	73,692	85,447	84,554	85,818	117,878	123,246

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
MANUFACTURERS LIGHT AND HEAT CO.						
26	134	138	114	0	0	0
28	0	274	198	0	0	0
32	1,195	1,389	1,150	0	0	0
33	5,240	5,631	4,179	0	0	0
36	0	92	64	0	0	0
Unknown	231	77	85	0	0	0
Total	6,800	7,601	5,790	0	0	0
MID-LOUISIANA GAS CO.						
26	6,452	8,737	8,603	10,054	9,713	10,963
28	932	787	536	586	578	508
29	511	273	550	0	0	0
32	1,490	1,874	1,779	1,711	1,963	1,851
35	54	52	0	0	51	57
49	1,913	1,121	0	0	0	0
80	442	417	443	432	155	0
92	648	658	646	628	231	0
94	58	53	0	0	0	0
Unknown	92	59	127	169	132	85
Total	12,592	14,031	12,684	13,580	12,823	13,464
MISSISSIPPI RIVER TRANSMISSION CORP.						
24	10,486	10,872	12,436	10,937	5,471	2,106
26	2,985	2,680	2,006	5,628	4,679	3,653
28	8,113	7,467	2,746	3,197	3,107	2,575
29	10,335	5,243	11,491	3,416	1,400	712
30	13	14	0	0	0	0
32	20,055	20,299	18,113	14,621	12,637	5,461
33	18,065	18,182	20,340	20,181	18,409	18,489
34	4,378	4,391	3,866	4,105	3,981	3,930
35	305	609	579	596	579	181
37	617	676	746	858	798	559
40	2	2	0	0	0	0
46	0	11	95	89	108	16
49	15,227	8,939	15,448	22,129	2,944	114
Unknown	21	16	231	163	176	304
Total	90,602	79,401	88,097	85,920	54,289	38,100
MONTANA-DAKOTA UTILITIES CO.						
13	593	599	720	996	899	845
14	513	606	618	597	600	729
20	2,574	2,941	3,626	3,053	3,172	3,136
24	0	194	194	216	328	412
29	1,040	1,695	1,933	2,085	2,724	3,283
32	2,445	2,361	2,356	2,666	3,695	4,387
49	0	0	447	456	0	0
Unknown	204	0	0	116	213	270
Total	7,369	8,396	9,894	10,185	11,631	13,062

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
NATURAL GAS PIPELINE CO. OF AMERICA						
28	5	5	5	4	4	3
29	8,409	8,081	7,925	7,713	7,828	8,705
32	261	264	265	37	16	14
33	1,952	2,107	2,022	1,210	392	318
Total	10,627	10,457	10,217	8,964	8,240	9,040
NORTHERN NATURAL GAS CO.						
07	79	66	72	70	58	95
10	20,501	22,076	26,280	24,301	23,443	24,925
20	11,718	10,027	10,339	10,199	10,631	10,990
28	11,048	8,561	8,966	9,063	9,056	1,814
29	13,401	14,679	20,753	21,728	24,405	33,904
32	4,022	3,522	3,432	3,417	3,016	3,218
33	14,294	15,075	15,365	15,357	17,027	18,972
34	463	379	284	299	341	436
46	102	53	0	0	0	0
49	16,314	11,997	8,610	11,494	6,821	6,876
80	0	94	0	0	0	123
Unknown	1,573	1,562	1,734	1,636	1,582	1,510
Total	93,515	88,091	95,835	97,564	96,380	102,863
NORTHERN UTILITIES, INC.						
10	139	141	149	NA	NA	154
13	537	479	1,127	NA	NA	2,425
29	6,089	6,424	7,128	NA	NA	7,856
Total	6,765	7,044	8,404	NA	NA	10,435
PANHANDLE EASTERN PIPELINE CO.						
20	804	796	812	759	723	541
28	22,882	22,446	23,679	22,192	21,258	20,674
30	696	764	885	1,010	1,025	699
32	11,467	11,680	11,880	11,025	11,034	9,747
33	2,097	2,341	2,314	2,205	2,240	1,934
34	1,440	1,429	1,402	1,189	1,326	1,161
37	4,013	4,352	3,652	4,340	4,462	3,961
46	646	578	625	541	532	420
49	1,405	1,365	683	668	701	494
91	115	130	124	84	60	132
Unknown	252	292	246	302	312	266
Total	45,817	46,173	46,302	44,315	43,673	40,029
PLATEAU NATURAL GAS CO.						
07	249	273	0	0	0	0
13	3,495	3,315	0	0	0	0
14	1,614	1,674	0	0	0	0
16	0	50	0	0	0	0
20	1,078	1,380	0	0	0	0
24	249	238	0	0	0	0
34	3,279	3,483	0	0	0	0

NA Not available.

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
PLATEAU NATURAL GAS CO.--Continued						
37	130	146	0	0	0	0
45	0	68	0	0	0	0
46	133	130	0	0	0	0
49	977	997	0	0	0	0
72	14	0	0	0	0	0
92	81	89	0	0	0	0
97	18	0	0	0	0	0
Unknown	488	507	0	0	0	0
Total	11,805	12,350	0	0	0	0
SHENANDOAH GAS CO.						
20	67	83	72	66	64	60
28	189	183	219	217	217	223
32	1,370	1,479	1,427	1,420	1,520	1,597
34	5	10	16	20	24	26
Unknown	5	5	5	3	0	0
Total	1,636	1,760	1,739	1,726	1,825	1,906
SOUTH GEORGIA NATURAL GAS CO.						
01	38	54	71	75	87	75
14	959	994	1,033	1,496	1,655	1,591
26	1,060	1,070	762	976	1,042	888
28	1,248	1,504	1,517	2,276	2,585	2,740
32	3,396	3,425	3,212	3,435	3,256	3,196
49	6,118	5,178	4,968	3,910	2,094	1,564
50	391	523	525	0	0	0
Total	13,210	12,748	12,088	12,168	10,719	10,054
SOUTHERN NATURAL GAS CO.						
13	123	148	0	0	0	0
14	561	533	360	353	217	340
20	1,901	1,762	1,859	1,742	1,149	1,508
22	4,156	3,949	3,888	3,965	3,589	3,340
24	1,218	2,187	1,901	1,924	1,513	1,707
26	8,976	6,524	5,648	4,020	4,766	6,500
28	18,882	20,260	18,993	17,427	16,806	15,738
29	2,119	2,210	2,311	2,523	2,277	2,489
30	1,604	1,398	1,256	853	505	956
32	15,916	14,837	14,190	9,345	7,074	8,503
33	21,811	24,273	24,764	22,541	20,462	18,325
34	2,740	2,657	4,720	4,433	2,828	4,007
36	60	70	70	0	0	0
49	8,812	3,876	5,091	2,337	509	836
Unknown	849	708	790	640	692	665
Total	89,728	85,392	85,841	72,103	62,387	64,914

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
SOUTHWEST GAS CORP.						
10	349	404	389	NA	NA	NA
14	714	794	423	NA	NA	NA
28	2,748	3,488	3,429	NA	NA	NA
32	4,297	5,087	6,092	NA	NA	NA
33	419	568	504	NA	NA	NA
34	0	5	106	NA	NA	NA
49	20,690	24,704	25,234	NA	NA	NA
91	67	65	62	NA	NA	NA
92	60	63	67	NA	NA	NA
97	0	0	842	NA	NA	NA
Unknown	0	39	0	NA	NA	NA
Total	29,344	35,217	37,148	NA	NA	NA
TENNECO, INC.						
28	879	929	994	1,067	1,116	1,198
Total	879	929	994	1,067	1,116	1,198
TENNESSEE NATURAL GAS LINES, INC.						
28	1,603	3,718	5,365	5,072	6,397	6,139
30	219	276	241	263	285	290
37	5,485	5,346	4,923	6,050	6,141	6,502
Total	7,307	9,340	10,529	11,385	12,823	12,931
TEXAS GAS TRANSMISSION CORP.						
28	2,144	1,908	4,385	5,816	6,043	5,524
32	1,234	887	628	454	534	593
49	5,416	6,652	9,322	6,081	4,481	4,086
Unknown	4	2	1	3	2	2
Total	8,798	9,449	14,336	12,354	11,060	10,205
TRANSCONTINENTAL GAS PIPELINE CORP.						
22	434	380	40	0	0	0
26	1,573	1,734	1,054	55	0	0
32	3,191	3,576	2,891	2,995	3,254	3,164
34	1,692	2,193	101	0	0	0
49	7	0	0	0	0	0
Unknown	35	33	10	2	0	0
Total	6,932	7,916	4,096	3,052	3,254	3,164
TRANSWESTERN PIPELINE CO.						
28	407	430	483	494	475	466
Total	407	430	483	494	475	466
TRUNKLINE GAS CO.						
32	121	135	133	114	NA	0
Unknown	24	28	28	38	NA	53
Total	145	163	161	152	NA	53

NA Not available.

Table 1.--Summary of main line natural gas sales to industrial users by SIC and natural gas companies for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
UNION GAS SYSTEM, INC.						
01	185	NA	NA	NA	NA	NA
15	52	NA	NA	NA	NA	NA
20	446	NA	NA	NA	NA	NA
28	72	NA	NA	NA	NA	NA
29	3,300	NA	NA	NA	NA	NA
32	2,044	NA	NA	NA	NA	NA
33	98	NA	NA	NA	NA	NA
34	765	NA	NA	NA	NA	NA
37	499	NA	NA	NA	NA	NA
46	95	NA	NA	NA	NA	NA
49	71	NA	NA	NA	NA	NA
91	1,404	NA	NA	NA	NA	NA
Unknown	252	NA	NA	NA	NA	NA
Total	9,283	NA	NA	NA	NA	NA
UNITED FUEL GAS CO.						
22	67	110	53	0	0	0
28	16,057	15,567	10,803	0	0	0
33	9,743	10,010	8,866	0	0	0
Total	25,867	25,687	19,722	0	0	0
UNITED GAS PIPELINE CO.						
13	2,599	3,078	3,104	2,399	1,878	1,745
14	0	0	0	620	591	580
20	151	277	232	5,014	5,491	5,196
22	18,717	18,972	17,306	15,846	9,314	3,633
23	59	0	0	0	0	0
24	13,192	15,177	14,322	12,625	7,183	6,831
26	79,683	82,563	81,371	74,283	41,430	36,783
28	35,230	37,113	34,037	34,650	28,018	25,516
29	54,898	57,844	35,795	48,781	32,153	29,297
30	78	97	85	136	118	123
32	10,195	10,324	9,786	8,973	7,155	6,518
33	9,573	9,953	9,691	8,427	4,228	3,822
34	82	70	0	0	0	0
35	1,278	1,312	994	953	1,103	1,275
36	218	195	187	167	158	160
46	1,589	1,606	1,620	1,501	1,277	521
49	95,193	102,106	112,072	280,144	226,018	125,738
91	217	245	273	276	311	350
96	690	685	686	669	681	0
97	3,940	4,012	4,078	4,809	4,778	3,590
Unknown	1,959	1,509	1,673	2,226	1,881	1,597
Total	329,541	347,138	327,312	502,499	373,766	253,275
Yearly total	1,586,149	1,653,219	1,674,096	1,717,562	1,544,905	1,385,232

NA Not available.

Source: Data compiled from table 4.

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf

SIC	1968	1969	1970	1971	1972	1973
ALABAMA						
20	159	154	160	157	129	99
22	2,172	2,072	1,650	1,494	1,362	1,155
24	1,218	2,136	1,870	1,903	1,497	1,700
26	20,695	21,726	20,808	17,839	12,084	10,541
28	10,609	12,071	10,973	13,335	14,561	15,271
29	1,634	1,537	1,691	1,755	1,724	1,672
30	1,604	1,398	1,256	853	505	956
32	19,816	19,502	18,270	12,862	9,052	9,723
33	34,604	38,214	38,533	34,830	30,122	27,819
34	1,876	2,369	2,114	1,970	1,168	2,160
37	761	779	808	882	901	1,038
49	9,291	7,042	8,172	4,465	2,946	3,685
Unknown	211	204	181	194	206	272
Total	104,650	109,204	106,486	92,539	76,257	76,091
ARIZONA						
28	1,094	1,170	1,167	976	1,159	1,230
32	839	918	1,170	993	1,053	1,058
33	26,704	33,479	34,119	32,301	34,492	36,406
49	31,635	36,996	32,194	39,520	45,490	34,633
91	101	130	147	99	186	171
Unknown	3,891	3,880	4,044	4,659	4,522	4,477
Total	64,264	76,573	72,841	78,548	86,902	77,975
ARKANSAS						
10	503	691	1,102	985	1,103	1,159
13	54	0	0	0	0	0
16	0	0	0	0	0	53
20	859	831	851	839	848	778
22	59	71	95	127	124	127
24	10,546	12,708	15,073	13,986	8,734	5,284
26	21,756	20,916	20,925	19,651	17,334	14,173
28	15,428	12,923	14,070	14,703	14,586	29,499
29	38,131	28,886	26,196	24,030	21,664	6,241
30	103	54	0	0	0	0
32	8,290	8,235	8,022	8,219	6,929	5,241
33	18,236	24,376	31,201	24,374	27,914	31,534
35	112	108	53	115	220	67
49	70,252	79,181	103,498	81,797	68,142	44,634
80	97	155	123	0	0	0
83	0	0	0	0	0	115
97	1,408	1,384	1,260	787	812	791
Unknown	490	538	572	813	775	558
Total	186,324	191,057	223,041	190,426	169,185	140,254

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
COLORADO						
01	128	116	104	123	0	53
10	652	638	667	579	399	283
13	100	130	239	429	259	160
20	2,683	3,496	3,414	2,775	2,831	2,933
24	249	238	0	0	0	0
32	14,776	15,678	15,441	16,179	16,731	15,368
45	0	68	0	0	0	0
49	21,270	24,697	24,309	31,864	32,188	26,622
72	14	0	0	0	0	0
91	8,336	9,231	9,600	9,282	9,689	9,739
Unknown	338	339	106	92	163	114
Total	48,546	54,631	53,880	61,323	62,260	55,272
DELAWARE						
20	457	384	588	322	317	113
28	2,239	2,271	1,930	2,216	2,275	2,197
29	1,105	1,137	1,453	1,121	877	1,089
30	251	211	182	214	242	152
91	461	665	592	604	191	182
Total	4,513	4,668	4,745	4,477	3,902	3,733
FLORIDA						
01	43	59	75	76	89	76
20	5,827	6,163	6,595	6,610	6,102	4,788
22	18,717	18,972	17,306	15,846	9,314	3,633
26	8,386	8,550	8,507	7,443	3,668	2,699
28	34,843	32,896	33,453	32,891	26,193	20,915
32	1,615	2,552	3,990	6,492	5,955	4,788
33	0	0	30	132	125	77
37	51	400	295	242	125	204
49	35,624	34,595	48,993	44,477	21,019	17,557
91	17,033	16,480	20,678	21,231	20,990	20,305
92	177	169	188	206	178	137
97	2,787	2,859	2,942	2,724	2,660	2,705
Unknown	27	32	5	16	3	3,862
Total	125,130	123,727	143,057	138,386	96,421	81,746
GEORGIA						
14	959	994	1,033	1,496	1,655	1,591
20	1,417	1,255	1,344	1,294	897	1,226
22	532	507	458	129	108	96
24	0	51	31	21	16	7
26	10,036	7,594	6,410	3,681	4,788	6,228
28	5,463	5,325	5,523	5,646	5,502	5,737
29	262	278	258	267	179	181
32	2,960	2,896	2,643	2,853	2,714	2,567
34	2,556	2,481	2,707	2,463	1,660	1,847
50	391	523	525	0	0	0
Unknown	48	0	0	0	0	0
Total	24,624	21,904	20,932	17,850	17,519	19,480

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
			ILLINOIS			
20	804	796	812	759	723	541
26	2,985	2,680	2,006	5,628	4,679	3,653
28	21,835	21,570	21,269	21,052	19,881	19,587
29	10,335	5,243	11,491	3,416	1,400	712
32	7,725	7,867	7,518	2,558	2,369	1,753
33	15,620	15,882	17,463	16,730	15,277	15,699
34	4,289	4,295	3,866	4,105	3,981	3,930
37	1,602	1,697	1,369	1,407	1,638	1,620
40	2	2	0	0	0	0
49	12,968	7,535	11,506	18,229	2,927	94
91	115	130	124	84	60	132
Unknown	135	171	206	261	242	223
Total	78,415	67,868	77,630	74,229	53,177	47,944
			INDIANA			
28	575	538	521	470	460	587
30	696	764	885	1,010	1,025	699
32	3,272	3,056	2,784	2,697	2,868	2,395
Unknown	20	23	18	23	19	16
Total	4,563	4,381	4,208	4,200	4,372	3,697
			IOWA			
07	79	66	72	70	58	95
20	7,338	6,164	7,780	7,410	8,337	8,657
32	397	439	431	441	16	14
46	50	0	0	0	0	0
49	8,792	6,855	5,585	5,384	2,620	3,005
80	0	94	0	0	0	123
Unknown	205	112	248	264	232	88
Total	16,861	13,730	14,116	13,569	11,263	11,982
			KANSAS			
01	681	606	619	662	706	585
07	337	476	193	194	82	105
13	3,495	3,315	0	0	0	0
14	2,973	3,376	1,725	1,746	1,738	2,066
15	52	0	0	0	0	0
16	0	50	0	0	0	0
20	1,313	1,068	64	141	140	137
28	14,735	20,353	19,898	22,690	26,230	25,848
29	42,661	33,966	33,790	32,620	33,267	35,467
30	1,597	1,804	1,660	1,914	1,824	1,741
32	14,532	11,658	10,391	10,603	10,947	10,446
34	4,044	3,483	0	0	0	0
35	712	720	719	694	732	735
37	2,363	1,908	1,613	1,559	1,512	1,190
46	1,596	1,374	1,292	1,214	1,269	1,188
49	51,899	67,427	70,372	82,547	83,575	78,646
80	76	76	75	75	78	80

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
KANSAS--Continued						
91	1,404	0	0	0	0	0
92	681	708	598	595	535	543
94	169	182	170	180	174	153
97	3,178	3,381	3,447	3,085	2,597	1,766
Unknown	2,617	2,249	2,019	1,920	1,868	1,907
Total	151,115	158,180	148,645	162,439	167,274	162,603
KENTUCKY						
10	39	41	40	37	38	34
28	2,215	1,923	4,385	5,816	6,043	5,524
29	0	0	0	0	63	86
31	0	0	0	0	100	107
32	1,170	1,277	1,019	910	666	720
33	6,766	8,002	7,194	6,864	6,325	6,595
Unknown	76	77	142	217	61	80
Total	10,266	11,320	12,780	13,844	13,296	13,146
LOUISIANA						
13	0	0	158	133	0	50
14	0	0	0	620	591	580
20	0	0	0	4,745	5,299	5,078
24	857	2,266	2,328	2,111	1,814	1,744
26	44,470	44,101	43,623	45,292	31,851	26,426
28	11,442	14,895	14,185	18,447	15,840	13,403
29	3,313	4,011	4,484	47,354	31,988	29,079
32	3,213	4,115	3,579	2,998	1,721	2,051
33	0	0	0	371	455	415
35	307	312	227	942	1,132	1,304
36	407	508	485	546	386	296
37	131	187	181	184	0	0
40	73	65	58	0	0	0
46	0	70	234	277	220	146
49	22,692	28,362	21,476	185,127	150,232	89,876
80	442	417	443	432	155	0
91	217	245	273	276	311	350
92	648	658	646	628	231	0
94	58	53	0	0	0	0
97	2,596	2,485	2,338	2,884	3,065	2,685
Unknown	968	706	680	1,710	1,595	1,539
Total	91,834	103,456	95,398	315,077	246,886	175,022
MARYLAND						
20	51	0	0	66	60	52
91	370	342	340	282	288	155
Total	421	342	340	348	348	207
MICHIGAN						
32	1,373	1,112	1,232	1,216	1,115	1,078
33	12,342	12,375	12,656	12,601	12,902	12,429
Total	13,715	13,487	13,888	13,817	14,017	13,507

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
MINNESOTA						
10	20,501	22,076	26,280	24,301	23,443	24,925
20	4,098	3,438	2,046	2,271	1,781	1,835
28	3,908	1,242	1,147	1,327	1,533	1,814
29	145	231	223	181	108	342
32	642	690	847	728	728	772
33	4,049	5,041	5,023	4,961	6,365	8,477
34	406	319	224	246	197	259
46	52	53	0	0	0	0
49	4,102	3,118	1,696	3,355	2,039	1,442
Unknown	432	390	440	263	245	252
Total	38,335	36,598	37,926	37,633	36,439	40,118
MISSISSIPPI						
13	1,927	2,404	2,562	2,399	1,667	1,572
20	476	630	587	560	315	301
24	11,363	11,818	12,053	10,568	5,431	5,087
26	18,079	21,287	20,116	19,236	12,381	14,152
28	21,886	23,868	23,150	21,069	20,894	20,621
29	2,783	1,858	1,909	2,117	1,095	1,312
30	78	97	85	136	118	123
32	5,020	5,303	5,342	4,907	4,698	4,847
33	1,173	1,230	1,279	1,008	0	0
35	179	166	158	160	266	277
36	278	265	257	167	158	160
46	1,589	1,606	1,565	1,400	1,225	521
49	75,413	76,642	85,108	87,967	82,761	44,213
96	690	685	686	669	681	0
97	1,153	1,153	1,136	1,053	1,057	0
Uknown	1,460	994	1,367	983	803	658
Total	143,547	150,006	157,360	154,399	133,550	93,844
MISSOURI						
20	228	288	262	319	308	267
26	51	0	0	0	0	54
28	13,735	13,542	10,542	9,634	9,094	8,338
30	13	14	0	0	0	0
32	19,812	19,973	18,320	18,480	16,384	9,603
33	4,397	4,407	4,899	4,661	3,524	3,108
34	1,529	1,525	1,402	1,189	1,326	1,161
35	305	609	579	596	579	181
37	617	728	797	858	798	559
46	339	326	397	320	304	209
49	10,187	11,774	15,501	15,881	11,641	11,216
92	0	57	0	0	0	0
Unknown	278	216	401	384	467	571
Total	51,491	53,459	53,100	52,322	44,425	35,267

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
MONTANA						
13	87	316	467	554	517	513
20	1,248	1,456	1,833	1,429	1,354	1,349
29	481	598	1,494	1,886	2,547	3,007
49	0	0	447	456	0	0
Unknown	0	0	0	0	43	47
Total	1,816	2,370	4,241	4,325	4,461	4,916
NEBRASKA						
01	1,383	1,509	1,228	1,142	1,023	1,017
07	1,138	1,326	1,095	1,318	1,459	1,914
13	421	571	575	401	230	180
20	11,188	11,702	11,788	11,505	9,818	10,170
28	6,324	6,423	7,014	6,929	6,732	0
29	8,409	8,139	8,035	7,812	7,828	15,366
32	4,741	4,464	4,216	4,118	4,451	4,454
34	129	142	131	122	144	177
46	0	0	64	0	0	0
49	15,336	15,100	16,235	16,913	12,688	14,982
80	255	259	245	233	226	213
92	0	0	0	54	53	50
94	93	103	122	126	0	0
97	142	945	682	624	596	454
Unknown	2,383	2,071	2,075	2,055	1,854	1,546
Total	51,942	52,754	53,505	53,352	47,102	50,523
NEVADA						
10	349	404	389	0	0	0
14	714	794	423	0	0	0
28	2,748	3,488	3,429	0	0	0
32	4,297	5,087	6,092	0	0	0
33	419	568	504	0	0	0
34	0	5	106	0	0	0
49	15,825	19,687	25,234	0	0	0
91	67	65	62	0	0	0
92	60	63	67	0	0	0
97	0	0	842	0	0	0
Unknown	0	39	0	0	0	0
Total	24,479	30,200	37,148	0	0	0
NEW HAMPSHIRE						
97	303	383	390	442	468	537
Total	303	383	390	442	468	537
NEW JERSEY						
36	0	92	64	0	0	0
Total	0	92	64	0	0	0

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
NEW MEXICO						
13	32	97	77	43	12	3
28	407	430	483	494	475	466
29	836	861	1,219	1,043	675	989
33	4,322	6,105	6,826	6,964	7,107	7,066
46	34	36	40	38	41	31
49	6,034	8,002	6,665	6,019	9,981	9,151
Total	11,665	15,531	15,310	14,601	18,291	17,706
NORTH CAROLINA						
Unknown	25	21	8	0	0	0
Total	25	21	8	0	0	0
NORTH DAKOTA						
29	559	1,097	439	199	177	276
Unknown	78	0	0	0	0	0
Total	637	1,097	439	199	177	276
OHIO						
28	8,474	8,524	9,595	9,290	7,508	6,554
32	5,773	5,961	5,897	2,406	2,548	5,664
33	5,426	6,031	5,976	0	0	0
37	2,411	2,655	2,283	2,933	2,824	2,341
49	208	149	269	255	203	146
Total	22,292	23,320	24,020	14,884	13,083	14,705
OKLAHOMA						
13	443	211	230	280	327	245
14	0	0	168	183	186	203
16	0	0	178	57	0	0
22	192	296	380	478	551	424
24	0	1,437	1,554	1,838	2,577	3,130
26	1,317	0	0	0	0	0
29	14,887	14,764	15,455	14,961	13,351	12,863
32	934	966	809	1,176	1,241	1,226
33	6,122	6,063	5,792	6,002	5,777	3,989
39	0	0	93	206	268	310
46	198	273	222	396	142	207
49	3,424	3,380	2,345	2,875	4,498	2,039
80	78	86	90	89	83	78
92	66	67	72	64	65	67
97	2,651	2,629	2,415	2,056	2,094	2,001
Unknown	632	679	680	773	836	745
Total	30,944	30,851	30,483	31,434	31,996	27,527
OREGON						
32	910	98	0	0	0	0
Total	910	98	0	0	0	0
PENNSYLVANIA						
34	20,718	23,461	24,983	0	0	8,827
Total	20,718	23,461	24,983	0	0	8,827

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
SOUTH CAROLINA						
14	561	533	360	353	217	340
22	1,886	1,750	1,820	2,342	2,119	2,089
32	3,191	3,576	2,891	2,995	3,254	3,164
49	2,343	0	0	0	0	0
Unknown	31	72	118	95	183	88
Total	8,012	5,931	5,189	5,785	5,773	5,681
SOUTH DAKOTA						
32	2,445	2,361	2,356	2,666	3,695	4,387
Unknown	56	7	7	124	175	179
Total	2,501	2,368	2,363	2,790	3,870	4,566
TENNESSEE						
26	7,377	6,966	8,183	8,103	7,827	7,948
28	9,920	12,870	14,638	14,618	17,292	17,260
30	219	276	241	263	285	290
32	2,891	2,923	2,824	2,791	3,242	3,324
33	5,638	5,745	5,440	5,252	5,557	6,122
37	5,485	5,346	4,923	6,050	6,141	6,502
96	1,853	1,893	2,526	2,656	2,700	2,511
97	56	66	65	64	63	62
Unknown	15	21	23	29	0	40
Total	33,454	36,106	38,863	39,826	43,107	44,059
TEXAS						
13	892	822	603	198	960	249
14	376	501	509	527	529	707
16	0	0	0	0	64	64
20	1,095	1,183	1,108	1,210	1,208	1,287
23	59	0	0	0	0	0
24	2,199	2,454	1,344	1,527	1,681	1,670
26	9,761	10,608	10,756	8,821	4,120	3,835
28	6,110	6,169	3,435	225	80	50
29	61,131	63,820	41,264	10,228	6,623	6,823
32	23,524	24,101	24,281	23,142	27,967	30,027
33	2,769	3,250	3,738	2,900	1,392	1,449
34	82	70	0	0	0	0
35	1,242	1,429	1,217	465	366	393
36	205	194	220	189	203	139
37	64	0	0	0	0	0
40	0	260	234	254	288	279
46	0	98	317	485	610	465
49	56,079	66,995	61,228	56,395	53,120	76,651
80	79	73	81	72	62	51
92	62	51	0	57	60	128
94	0	133	127	112	114	117
97	4,041	3,545	3,678	3,212	3,067	2,771
Unknown	3,103	3,340	3,196	3,732	24,583	3,686
Total	172,873	189,096	157,336	113,751	127,097	130,841

Table 2.--Summary of main line natural gas sales to industrial users by SIC and States for 1968-73, MMcf--Continued

SIC	1968	1969	1970	1971	1972	1973
VIRGINIA						
32	407	435	408	435	448	429
34	5	10	16	20	24	26
Unknown	1	6	0	0	0	0
Total	413	451	424	455	472	455
WASHINGTON						
28	4,584	4,196	3,752	4,111	4,950	5,042
Total	4,584	4,196	3,752	4,111	4,950	5,042
WEST VIRGINIA						
20	67	83	72	66	64	60
22	67	110	53	0	0	0
26	878	744	548	0	0	0
28	16,357	16,133	11,953	631	443	852
30	0	0	0	0	52	69
32	2,392	2,606	2,342	985	1,072	1,168
33	9,557	9,610	7,069	0	0	0
34	0	0	81	87	77	74
Unknown	259	86	137	57	0	0
Total	29,577	29,372	22,255	1,826	1,708	2,223
WYOMING						
10	407	389	412	304	317	459
13	1,043	762	1,380	442	382	2,757
14	513	606	618	597	600	729
20	1,999	2,229	2,794	2,284	2,663	2,649
24	0	194	194	216	328	412
28	267	326	424	512	562	539
29	6,089	6,424	7,128	0	0	7,856
Unknown	72	0	0	0	5	59
Total	10,390	10,930	12,950	4,355	4,857	15,460
Yearly total	1,586,149	1,653,219	1,674,096	1,717,562	1,544,905	1,385,232

Source: Data compiled from table 4.

Table 3.--Summary of main line natural gas sales to industrial users, by type of sale--1972-73, MMcf

State	Firm (1)	Offpeak (2)	Interruptible (3)	Not specified (4)	Total (5)
1972					
Alabama	56,658	0	19,599	0	76,257
Arizona	86,902	0	0	0	86,902
Arkansas	163,714	0	5,471	0	169,185
Colorado	0	52	2,324	59,884	62,260
Delaware	3,316	0	463	123	3,902
Florida	32,699	0	63,719	3	96,421
Georgia	3,612	0	13,907	0	17,519
Illinois	26,946	0	26,231	0	53,177
Indiana	0	0	4,372	0	4,372
Iowa	8,391	0	2,872	0	11,263
Kansas	29,334	0	111,197	26,743	167,274
Kentucky	11,186	0	2,110	0	13,296
Louisiana	244,572	0	1,709	605	246,886
Maryland	157	0	191	0	348
Michigan	10,662	0	3,355	0	14,017
Minnesota	29,446	0	6,993	0	36,439
Mississippi	113,888	0	7,546	12,116	133,550
Missouri	8,210	0	35,975	240	44,425
Montana	0	0	2,847	1,614	4,461
Nebraska	22,446	0	24,656	0	47,102
Nevada	0	0	0	0	0
New Hampshire	141	0	327	0	468
New Jersey	0	0	0	0	0
New Mexico	17,807	0	484	0	18,291
North Carolina	0	0	0	0	0
North Dakota	0	0	177	0	177
Ohio	7,508	0	5,575	0	13,083
Oklahoma	16,439	0	15,283	274	31,996
Oregon	0	0	0	0	0
Pennsylvania	0	0	0	0	0
South Carolina	3,889	0	1,884	0	5,773
South Dakota	5	0	3,865	0	3,870
Tennessee	23,956	0	18,510	641	43,107
Texas	18,579	0	108,518	0	127,097
Virginia	252	0	220	0	472
Washington	4,950	0	0	0	4,950
West Virginia	979	0	729	0	1,708
Wyoming	562	0	4,295	0	4,857
Total	947,206	52	495,404	102,243	1,544,905

Table 3.--Summary of main line natural gas sales to industrial users, by type of sale--1972-73, MMcf--Continued

State	Firm (1)	Offpeak (2)	Interruptible (3)	Not specified (4)	Total (5)
1973					
Alabama	52,326	0	23,765	0	76,091
Arizona	77,975	0	0	0	77,975
Arkansas	138,148	0	2,106	0	140,254
Colorado	0	112	2,200	52,960	55,272
Delaware	3,366	0	321	46	3,733
Florida	22,419	0	59,327	0	81,746
Georgia	3,602	0	15,878	0	19,480
Illinois	26,289	0	21,655	0	47,944
Indiana	0	0	3,697	0	3,697
Iowa	8,565	0	3,417	0	11,982
Kansas	31,692	0	104,012	26,899	162,603
Kentucky	11,164	0	1,982	0	13,146
Louisiana	174,499	0	49	474	175,022
Maryland	30	0	177	0	207
Michigan	10,495	0	3,012	0	13,507
Minnesota	32,782	0	7,336	0	40,118
Mississippi	76,417	0	6,611	10,816	93,844
Missouri	7,830	0	27,216	221	35,267
Montana	0	0	2,889	2,027	4,916
Nebraska	23,808	0	26,715	0	50,523
Nevada	0	0	0	0	0
New Hampshire	126	0	411	0	537
New Jersey	0	0	0	0	0
New Mexico	17,240	0	466	0	17,706
North Carolina	0	0	0	0	0
North Dakota	0	0	276	0	276
Ohio	6,554	3,522	4,629	0	14,705
Oklahoma	11,872	0	15,452	203	27,527
Oregon	0	0	0	0	0
Pennsylvania	7,976	0	851	0	8,827
South Carolina	3,832	0	1,849	0	5,681
South Dakota	6	0	4,560	0	4,566
Tennessee	24,922	0	18,570	567	44,059
Texas	17,310	0	113,531	0	130,841
Virginia	220	0	235	0	455
Washington	5,042	0	0	0	5,042
West Virginia	1,389	0	834	0	2,223
Wyoming	539	0	14,921	0	15,460
Total	798,435	3,634	488,950	94,213	1,385,232

Source: Data compiled from table 4.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Alabama-Tennessee Natural Gas Co.:															
Amoco Chemicals Corp. 1/	28	F	Decatur	403	402	0	0	0	0	40.3	40.4	0	0	0	0
Do	28	I	--do--	3,169	3,777	2,700	4,697	5,889	6,299	28.9	28.9	28.9	35.3	35.6	35.7
Do 1/	28	F	--do--	423	873	1,451	1,680	1,686	1,679	43.7	43.8	42.4	46.5	47.5	47.4
Champion International Corp. 2/	26	F	Courtland	0	0	11	44	44	44	0	0	49.6	55.8	58.4	56.9
Do 2/	26	I	--do--	0	0	140	1,332	1,419	1,258	0	0	28.7	35.2	35.7	36.1
Ford Motor Co.	37	F	Listerhill	761	779	808	882	901	1,037	43.0	43.8	44.0	50.7	51.3	50.0
Do	37	I	--do--	0	0	0	0.1	0	1	0	0	0	49.2	0	47.5
Reynolds Metals Co.	33	F	--do--	4,218	5,099	5,137	4,989	5,646	5,818	41.7	41.1	38.7	47.2	46.8	47.0
Do	33	I	--do--	82	30	38	32	46	40	29.7	29.8	29.8	33.7	37.1	37.0
Do	33	F	--do--	93	8	9	9	12	17	37.0	37.9	37.1	44.6	45.7	46.4
Do	33	I	--do--	0	81	173	211	183	212	0	29.8	29.6	36.3	36.8	37.1
Tennessee Valley Authority	49	F	Wilson Dam	1,831	1,826	1,826	1,623	1,830	1,809	40.0	40.2	40.0	48.8	48.4	49.1
Do	49	I	--do--	984	1,340	1,255	505	607	1,040	30.1	30.2	30.1	34.6	38.4	40.1
USS Agri-Chemicals, Inc. 3/	28	F	Cherokee	0	0	0	528	533	547	0	0	0	48.9	49.6	49.5
Do 3/	28	I	--do--	339	370	553	157	261	707	28.1	28.1	28.2	33.0	35.2	35.9
Subtotal or average	-	-	-	12,303	14,585	14,101	16,689	19,057	20,508	36.8	36.7	36.3	42.5	42.5	42.4
Southern Natural Gas Co.:															
Alabama Power Co.	49	F	Gadsden	0	112	117	108	100	94	0	41.3	43.0	51.0	51.5	51.5
Do	49	I	--do--	6,476	3,764	4,974	2,229	409	742	22.3	26.8	28.4	35.3	36.0	36.0
Alabaster Lime Co.	32	I	Alabaster	385	681	509	266	142	220	29.8	29.9	31.7	39.4	40.5	39.6
Allison Lumber Co.	24	I	Bellamy	329	265	216	247	127	57	33.5	33.6	35.5	44.9	45.4	46.1
American Can Co.	34	F	Butler	0	0	656	676	644	690	0	0	38.1	37.7	46.7	47.4
Do	34	I	--do--	0	0	1,180	1,148	373	1,320	0	0	32.2	42.3	43.3	43.2
Bickerstaff Clay Products Co., Inc.	32	I	Brickyard	564	554	524	529	352	363	35.8	36.1	37.8	44.0	44.4	44.3
Do	32	I	Brickyard (Dixieland)	606	615	578	569	383	414	35.8	36.1	37.8	44.0	44.4	44.3
Bordon Co.	20	I	Demopolis	159	154	160	157	129	99	37.1	37.3	39.7	45.7	46.4	46.3
Brown Wood Preserving Co.	24	I	Brownville	70	79	93	0	0	0	35.5	35.7	35.7	0	0	0
Cement Asbestos Products Co.	32	I	Ragland	101	102	64	53	0	0	29.8	29.9	32.7	42.4	0	0
Cheney Lime and Cement Co.	32	I	Landmark	262	264	435	422	241	300	29.8	29.8	32.7	38.4	41.6	42.7
Continental Can Co., Inc.	34	F	Fairfield	0	0	165	135	138	137	0	0	43.3	47.6	48.4	48.3
Do	34	I	--do--	184	176	12	11	13	13	42.7	42.7	42.7	62.2	83.2	81.6
Cordova Brick Co., Inc.	32	I	Cordova	0	0	0	0	82	64	0	0	0	0	44.7	44.3
Glen-Gery Corp.	32	I	Bessemer	164	196	167	85	101	0	37.4	37.2	35.9	41.2	44.3	0
Do	32	I	Cordova	226	204	0	0	0	0	35.6	35.7	0	0	0	0
Goodyear Tire and Rubber Co.	30	F	Gadsden	0	0	0	71	37	68	0	0	0	52.0	54.3	52.2
Do	30	I	--do--	1,604	1,398	1,256	782	468	888	25.6	26.5	30.6	39.3	41.3	40.8
Gulf States Paper Corp.	26	I	Demopolis	0	0	0	1,315	1,020	1,160	0	0	0	45.8	50.7	50.5
Hercules, Inc.	28	I	McAdory	164	171	182	166	101	132	37.5	37.7	39.8	45.3	46.3	46.2
Hunt Oil Co.	29	F	Tuscaloosa	934	854	1,003	1,026	1,003	996	37.2	37.4	37.7	45.0	46.4	46.3
Lehigh Portland Cement Co.	32	I	Birmingham	1,823	1,625	1,112	0	0	0	27.1	27.2	32.1	0	0	0
Lone Star Industries, Inc. 4/	32	I	Spocari	877	939	1,012	1,025	1,113	1,042	29.5	29.7	31.3	44.7	49.6	49.3
Do 4/	32	I	Tarrant	1,551	1,495	1,588	152	0	0	27.1	27.2	29.9	26.9	0	0
Longview Lime Co.	32	I	Saginaw	662	991	1,027	672	297	670	29.8	29.9	32.1	38.9	41.0	39.7
MacMillan Bloedel United, Inc.	24	F	Perry County	168	570	634	683	657	663	31.2	35.6	36.4	46.1	46.4	46.2
Do	24	I	--do--	651	1,222	927	973	713	980	25.0	25.1	27.6	40.5	43.7	42.8
Martin Marietta Cement, Southern Div. 5/	32	I	Calera (cement)	2,168	1,862	1,697	1,449	1,392	1,899	27.0	27.1	29.5	43.8	46.4	46.2
Do 5/	32	I	Calera (lime)	2,098	2,099	1,965	1,318	1,221	1,765	27.0	27.1	29.1	43.3	46.9	46.2
Mount Vernon Mills, Inc.	22	I	Tallassee	140	157	144	114	67	74	35.8	36.1	37.7	43.9	44.4	44.2
National Cement Co.	32	I	Ragland	1,192	1,384	1,107	672	69	68	27.0	27.1	29.6	35.7	40.6	36.2
Ragland Brick Co.	32	I	--do--	188	173	148	147	124	98	35.3	35.5	37.4	43.7	44.3	44.3
Stephenson Brick and Tile Co.	32	I	Lovick	228	182	96	0	0	0	35.3	35.5	37.2	0	0	0
United States Steel Corp:															
Fairfield Works	33	I	Birmingham	3,648	5,635	1,020	159	24	13	31.0	30.3	27.5	32.9	37.5	38.9
Do	33	F	--do--	18,163	18,638	23,744	22,382	20,438	18,312	37.8	37.7	36.7	42.0	45.9	46.6
Universal Atlas Cement Div.	32	I	Leeds	1,582	912	1,529	1,102	758	499	27.0	27.2	29.6	50.1	52.6	52.4
Vulcan Materials Co.	32	I	Wylam	0	0	0	58	0	0	0	0	0	46.1	0	0
West Point-Pepperell, Inc.	22	I	Fairfax	382	341	380	344	354	340	33.9	34.1	35.2	44.1	48.8	50.6
Do	22	I	Lanett	119	106	101	116	99	99	33.9	34.1	35.2	43.8	48.8	48.9
Do	22	I	Langdale	56	61	74	80	76	73	33.9	34.1	35.2	43.6	48.8	48.9
Do	22	I	Shawmut	88	90	77	64	62	57	33.9	34.1	35.0	43.6	48.8	48.9

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Alabama

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Southern Natural Gas Co.-Continued															
West Point-Pepperell, Inc:															
Lanett Bleachery and Dye Works----	22	1	Lanett	953	937	834	776	704	512	33.9	34.1	35.2	43.9	48.8	48.9
Sales less than 50,000 Mcf---------	NA	1	NA	173	184	166	174	180	247	39.1	39.7	40.3	45.3	52.0	46.3
Subtotal or average-----------	-	-	-	49,138	49,192	51,673	42,455	34,211	35,168	31.8	32.7	33.9	42.1	46.2	46.1
Transcontinental Gas Pipe Line Corp.:															
American Can Co.-------------------	34	1	Marathon Southern	1,692	2,193	101	0	0	0	32.3	32.3	33.3	0	0	0
Avondale Mills---------------------	22	1	Alexander City	62	50	8	0	0	0	32.3	32.3	33.3	0	0	0
Gulf States Paper Corp.------------	26	1	Linden	1,573	1,734	1,054	55	0	0	32.3	32.3	33.3	36.0	0	0
Russell Manufacturing Co.----------	22	1	Alexander City	372	330	32	0	0	0	32.3	32.3	33.3	0	0	0
Subtotal or average-----------	-	-	-	3,699	4,307	1,195	55	0	0	32.3	32.3	33.3	36.0	0	0
United Gas Pipe Line Co.:															
Allied Paper Inc.															
Subsidiary of SCM Corp.-----------	26	F	Jackson	3,077	3,085	3,483	3,029	1,762	1,149	26.8	27.0	27.3	28.9	30.0	82.9
Aluminum Co. of America------------	33	F	Mobile	8,400	8,723	8,412	7,048	3,773	3,407	26.8	27.1	27.4	29.1	30.6	60.6
Chevron Asphalt Co.----------------	29	F	--do--	700	683	688	729	721	676	30.3	30.6	30.9	32.5	33.7	60.6
Container Corp. of America---------	26	F	Brewton	4,358	4,461	4,302	3,636	1,938	1,707	26.7	27.0	27.3	28.9	30.0	57.8
Courtaulds North America, Inc.------	28	F	Salco	3,378	3,529	3,220	2,911	2,777	2,645	26.8	27.0	27.8	29.6	30.4	58.0
GAF Corp.--------------------------	28	F	Mobile	605	603	474	632	644	623	30.5	30.9	31.4	32.5	33.8	60.7
Ideal Cement Co., Division of Ideal Basic Industries, Inc.-------	32	F	--do--	3,687	3,703	3,407	3,002	1,655	1,248	27.3	27.6	28.0	29.6	31.1	60.7
International Paper Co.------------	26	F	Magazine Point	3,557	3,713	2,916	2,007	1,163	939	27.2	27.5	28.0	29.8	31.2	60.4
National Gypsum Co.----------------	32	F	Mobile	1,452	1,521	1,305	1,341	1,122	1,073	28.8	28.9	29.8	30.8	31.8	60.5
Scott Paper Co.--------------------	26	F	--do--	7,489	8,075	8,285	5,902	4,173	3,690	26.8	27.1	27.4	29.2	30.3	60.6
Shell Chemical Co., a Division of Shell Oil Co.---------------------	28	F	LeMoyne	0	87	110	102	130	142	0	31.5	31.6	33.4	34.2	58.0
Stauffer Chemical Co.--------------	28	F	Salco	2,128	2,259	2,283	2,462	2,540	2,497	26.9	27.0	27.8	29.6	30.4	84.0
Stone Container Corp.--------------	26	F	Mobile	641	658	617	519	565	594	30.3	30.7	31.1	33.1	34.1	60.7
Sales less than 50,000 Mcf----------	NA	F	NA	38	20	15	20	26	25	32.9	35.0	36.4	35.8	36.0	28.0
Subtotal or average-----------	-	-	-	39,510	41,120	39,517	33,340	22,989	20,415	27.1	27.4	27.8	29.5	30.8	64.1
State total-------------------	-	-	-	104,650	109,204	106,486	92,539	76,257	76,091	NAp	NAp	NAp	NAp	NAp	NAp

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NA Not available. NAp Not applicable.

1/ Data combined in 1970, 1971, 1972, 1973.

2/ Formerly listed as U.S. Plywood Champion Papers.

3/ Formerly listed as Armour Agri. Chemical Co.

4/ Formerly Lone Star Cement Corp.

5/ Formerly Southern Cement Co.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
El Paso Natural Gas Co.:															
American Smelting and Refining Co.	33	F	Hayden	1,841	2,249	2,809	2,725	2,794	3,302	34.0	35.0	36.1	39.6	41.1	44.9
Apache Powder Co.	28	F	Curtiss	1,094	1,170	1,167	976	1,159	1,230	30.6	33.2	35.9	39.4	41.1	44.8
Arizona Public Service Co.	49	F	Phoenix	6,970	9,333	8,183	10,465	12,011	6,738	30.6	33.5	36.2	39.4	41.2	44.3
Do	49	F	--do--	0	0	47	402	1,367	2,180	0	0	36.8	40.6	41.2	43.6
Do	49	F	Tucson Pinal County	1,007	1,583	2,778	6,063	8,142	5,368	30.7	33.9	36.7	40.1	41.2	44.0
Do	49	F	Yuma	0	0	0	0	295	437	0	0	0	0	41.2	44.5
Citizens Utilities Co.	49	F	Nogales	175	109	60	35	25	11	30.6	33.1	36.0	40.1	41.1	44.2
Compania Minera de Cananea, S.A.	NA	F	Naco	3,891	3,880	4,044	4,659	4,522	4,477	30.6	33.2	36.1	39.6	41.1	44.7
Inspiration Consolidated Copper Co.	33	F	Gila County	2,680	3,786	3,632	2,988	3,617	3,773	30.5	33.2	36.0	39.5	41.1	44.8
Kennecott Copper Corp.	33	F	Hayden	3,405	4,434	4,744	4,139	3,716	3,873	32.4	34.1	36.1	39.6	41.1	44.8
Magma Copper Co.	33	F	San Manuel	2,414	3,555	3,660	4,447	6,503	7,768	30.5	33.3	36.0	39.9	41.1	45.1
Do	33	F	Superior	991	1,159	1,127	695	103	102	30.6	33.3	36.0	39.1	41.0	44.4
Paul Lime Plant, Inc.	32	F	Paul Spur	839	918	1,170	993	1,053	1,058	30.6	33.3	36.1	39.6	41.1	44.6
Phelps Dodge Corp.	33	F	Ajo	3,046	3,691	3,501	3,152	3,450	3,121	30.6	33.3	36.0	39.6	41.1	44.7
Do	33	F	Bisbee	728	821	756	693	531	634	30.6	33.2	36.0	39.5	41.1	45.1
Do	33	F	Douglas	3,973	4,662	4,281	4,017	4,337	4,311	30.6	33.3	36.0	39.6	41.1	44.8
Do	33	F	Morenci	7,626	9,122	9,609	9,445	9,441	9,522	30.6	33.2	36.0	39.6	41.1	45.0
Safford, City of	91	F	Safford	80	109	112	78	165	148	30.6	33.5	36.3	40.1	41.2	44.2
Tucson Gas and Electric Co.	49	F	Tucson	18,618	20,954	21,126	22,555	23,650	19,899	30.6	33.3	36.1	39.8	41.1	44.2
United States Dept. of the Interior:															
Pima Indian Agency	91	F	Sacaton	21	21	35	21	21	23	20.2	20.2	20.2	20.2	20.2	20.2
Subtotal or average	-	-	-	59,399	71,556	72,841	78,548	86,902	77,975	30.8	33.4	36.1	39.8	41.1	44.6
Southwest Gas Corp. 1/															
Irrigation Customers (489)	49	OP	NA	4,865	5,017	NA	NA	NA	NA	38.2	41.5	NA	NA	NA	NA
Subtotal or average	-	-	-	4,865	5,017	NA	NA	NA	NA	38.2	41.5	NA	NA	NA	NA
State total	-	-	-	64,264	76,573	72,841	78,548	86,902	77,975	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

1/ Form 2 was not available from Federal Power Commission for years 1971, 1972, and 1973.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Arkansas-Louisiana Gas Co.:															
Acme Brick Co.	32	I 1/	Hot Spring	1,334	1,402	1,398	1,477	1,594	1,666	27.5	28.0	28.6	29.5	33.9	39.8
Agrico Chemical Co. 2/	28	F	Mississippi	0	0	0	0	0	14,701	0	0	0	0	0	39.5
Aluminum Co. of America	33	I 1/	Saline	12,557	12,916	13,077	12,018	11,560	10,332	24.9	25.3	27.7	29.6	33.2	39.2
American Cyanamid Co.	32	I 1/	--do--	270	272	302	299	294	218	27.9	27.9	27.8	33.8	34.4	41.8
American Oil Co.	29	I 1/	Union	2,523	2,458	2,351	2,120	321	0	26.3	26.4	26.6	27.3	30.5	0
Arkansas Chemical, Inc.	28	I 1/	--do--	597	816	924	602	589	636	29.9	30.1	32.1	33.1	34.4	39.4
Arkansas Electric Coop.	49	I 1/	Augusta	3,448	4,525	5,152	4,830	3,721	998	28.3	28.3	30.9	30.6	32.3	37.8
Do	49	I 1/	Franklin	457	628	699	781	515	242	26.6	27.1	29.2	30.6	33.3	37.8
Do	49	F	Ouachita	0	0	0	507	3,150	3,355	0	0	0	31.4	33.0	37.0
Arkansas Grain Corp.	20	I	Phillips	859	831	851	0	0	0	27.7	27.7	27.7	0	0	0
Arkansas Kraft Corp.	26	I 1/	Conway	1,762	1,474	1,317	1,285	1,089	1,192	28.0	28.8	29.2	29.8	33.4	39.0
Arkansas Power and Light Co.	49	I 1/	Lafayette	3,055	4,405	3,248	2,050	1,839	2,634	25.6	26.1	26.6	27.1	30.7	36.0
Do	49	I 1/	Hot Spring	10,746	10,671	33,722	32,072	25,342	17,415	26.5	26.9	25.6	25.9	31.0	37.0
Do	49	I 1/	Pulaski	6,529	9,163	6,972	5,241	7,172	5,648	26.6	27.0	27.6	28.2	31.6	37.1
Do	49	I 1/	Phillips	43,834	46,512	46,691	35,231	26,403	14,342	24.1	24.8	24.3	24.8	31.2	37.9
Asphalt Products Co.	29	I	Pulaski	78	51	53	0	0	0	28.3	28.6	28.6	0	0	0
Baroid Div. National Lead Co.	32	I 1/	Hot Spring	185	195	135	133	147	141	30.3	30.7	32.1	33.0	34.9	46.5
Berry Petroleum Co.	29	I 1/	Nevada	618	652	643	602	538	0	26.8	27.1	27.3	28.1	32.6	0
Do	29	I 1/	Ouachita	400	399	437	359	380	347	27.4	27.7	27.7	28.8	32.6	39.5
Bibler Bros. Lumber Co.	24	I 1/	Pope	60	60	0	88	106	104	28.5	28.5	0	33.9	34.7	43.8
Bromet Co.	28	I 1/	Columbia	0	614	1,787	1,752	1,476	1,250	0	26.4	26.4	27.1	31.5	37.3
Celotex Corp.	26	I 1/	Ouachita	217	232	212	233	235	241	30.9	29.7	29.4	30.8	34.7	47.1
Cherokee Carpet Mills	22	I 1/	Lafayette	59	71	95	127	124	127	28.5	28.4	28.2	33.5	34.6	43.5
Cities Service Co. 3/	28	F	Union	0	0	0	693	739	783	0	0	0	30.0	34.5	40.3
Columbia Carbon Co.	28	I	--do--	614	645	790	0	0	0	29.1	29.4	29.4	0	0	0
Continental Oil Co.	29	I 1/	Mississippi	10,639	13,356	14,357	13,559	13,977	0	26.1	26.5	27.0	27.5	33.5	0
Cross Oil and Refining Co.	29	I 1/	Union	853	755	734	638	532	426	27.8	28.0	28.0	28.7	33.3	38.8
Dierks Forrest Inc.	26	I	Howard	802	0	0	0	0	0	27.9	0	0	0	0	0
Do	26	I	Jefferson	989	0	0	0	0	0	27.1	0	0	0	0	0
Dixie Brick Co.	32	F	Union	0	0	0	0	65	0	0	0	0	0	39.3	0
Dow Chemical Co.	28	I 1/	Columbia	354	404	451	363	395	401	27.8	27.8	27.8	33.7	34.4	41.8
Elk Roofing Co.	29	I 1/	Ouachita	388	320	294	324	334	344	27.4	28.1	28.4	29.0	33.2	47.3
Evans, Rip, Construction Co.	16	F	Carland	0	0	0	0	0	53	0	0	0	0	0	48.4
Flint Steel Corp.	35	I	Crittenden	62	55	53	0	0	0	31.0	31.2	35.3	0	0	0
Great Lakes Chemical Corp.	28	I 1/	Union	363	461	650	821	969	957	29.6	29.7	31.2	31.7	33.9	39.3
A.P. Green Refractories Co.	32	I 1/	Saline	467	467	437	381	372	343	28.5	28.9	29.6	30.4	32.2	37.4
Hogan, Ben M., Co.	32	F	Pulaski	0	0	0	0	82	71	0	0	0	0	34.6	44.5
Humble Oil and Refg. Co.	29	I	Lafayette	68	0	0	0	0	0	24.3	0	0	0	0	0
Ideal Cement Co.	32	I	Howard	165	221	245	0	0	0	31.4	31.0	35.9	0	0	0
International Paper Co.	26	I 1/	Ouachita	4,304	3,684	3,381	3,272	3,128	2,884	26.2	25.4	25.0	26.5	31.6	37.7
Do	26	I 1/	Jefferson	12,360	12,508	12,964	11,591	9,690	6,892	25.6	26.0	26.5	27.1	31.4	37.2
Do	26	I 1/	Hot Spring	87	184	186	130	156	174	25.4	26.0	26.4	27.5	32.7	46.8
Jet Ashpalt and Rock Co.	29	F	Ouachita	0	0	0	53	51	0	0	0	0	34.5	35.2	0
Lion Oil Co.	29	I 1/	Union	5,152	5,253	5,342	4,480	4,001	3,888	25.5	26.0	26.1	26.5	32.7	39.0
Macmillan Ring Free Oil Co.	29	I 1/	--do--	843	774	713	610	499	405	27.8	27.9	28.0	28.7	33.2	38.8
Michigan Chemical Corp.	28	I 1/	--do--	161	184	265	283	415	510	28.0	27.9	27.9	40.9	39.3	45.4
Minnesota Mining and Manufacturing Co.	28	I 1/	Pulaski	580	571	490	567	607	611	28.3	28.7	30.5	30.8	32.6	39.5
Mobil Oil Co.	29	I	Nevada	914	345	0	0	0	0	24.2	24.1	0	0	0	0
Monsanto Co.	29	I 1/	Union	15,655	4,406	1,215	1,233	1,031	831	25.1	25.4	25.3	25.9	32.6	39.2
Nekoosa Edwards	26	I 1/	Little River	1,235	2,834	2,865	2,695	2,435	2,319	27.7	27.7	29.1	29.6	32.6	38.0
Norton Co.	35	F	Saline	0	0	0	115	220	57	0	0	0	38.7	39.2	41.8
Olinkraft, Inc.	26	F	Union	0	0	0	445	601	471	0	0	0	28.1	31.7	37.8
Phillips Petroleum Co.	29	I 1/	Lafayette	0	58	57	52	0	0	0	24.2	24.5	29.9	0	0
Porocel Corp.	28	I 1/	Pulaski	128	139	132	139	134	129	28.1	28.0	30.2	34.0	31.8	42.3
Prescott Industrial Products Co.	NA	F	Nevada	0	0	0	176	193	156	0	0	0	38.7	39.3	47.2
Reynolds Metals Co.	33	I 1/	Hot Spring, Saline	5,322	11,095	17,760	11,986	15,954	20,807	25.5	25.7	27.0	27.4	32.8	39.5
Do	33	I 1/	Clark	357	365	364	370	400	395	27.3	26.1	26.7	27.6	33.3	39.7
Riceland Foods 4/	20	F	Phillips	0	0	0	839	848	778	0	0	0	33.7	34.4	42.1
Robbins Products, Inc.	30	I	Nevada	103	54	0	0	0	0	33.0	44.2	0	0	0	0
Sohio Petroleum Co.	29	I	Ouachita	0	59	0	0	0	0	0	24.2	0	0	0	0
Stauffer Chemical Co.	28	I 1/	Pulaski	131	185	176	178	138	136	28.1	27.9	28.0	33.9	34.6	43.0
Two Rivers Co.	NA	F	Miller	0	0	0	62	86	0	0	0	0	34.2	34.0	0
Union Carbide Corp.	10	I 1/	Carland	503	691	1,102	985	1,103	1,159	29.3	29.3	29.5	30.0	33.5	39.2
Urbana Manufacturing Co.	NA	I 1/	Union	0	106	169	188	206	183	0	28.1	26.8	34.2	34.5	42.7
Weyerhaeuser Co.	24	I 1/	Howard	0	839	1,725	1,031	1,181	1,137	0	28.4	29.3	30.0	33.3	39.1
Do	24	I 1/	Jefferson	0	937	912	768	639	547	0	27.8	29.2	29.6	32.7	38.7
Do	24	F	Howard .	0	0	0	1,162	1,337	1,390	0	0	0	29.7	32.6	37.2
Wheless Drilling Co.	13	I	Columbia	54	0	0	0	0	0	26.2	0	0	0	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Arkansas Louisiana Gas Co.-Continued															
Arkansas Cement Corp. (Assoc. Co.)---	32	I 1/	Little River	5,869	5,678	5,505	5,929	4,375	2,802	27.5	27.8	28.8	30.8	32.8	37.7
Arkla Air Cond. (Assoc. Co.)---------	35	I 1/	Nevada	50	53	0	0	0	10	28.6	28.6	0	0	0	46.6
Arkla Chemical Corp. (Assoc. Co.)----	28	I	Jefferson	835	692	0	0	0	0	28.9	29.3	0	0	0	0
Do----------------------------------	28	I 1/	Columbia	2,462	720	0	67	0	0	29.2	29.8	0	63.7	0	0
Do----------------------------------	28	I 1/	Phillips	8,563	6,824	7,903	8,897	8,550	8,732	26.6	27.1	28.4	30.6	34.1	39.4
Do----------------------------------	28	I 1/	Clark	640	668	502	341	574	653	29.2	29.6	30.1	34.8	35.4	45.7
Sales less than 50,000 Mcf-----------	NA	I 1/	NA	490	432	403	387	290	219	28.5	32.0	33.7	37.2	36.7	46.3
Sales to Public Authorities:															
U.S. Little Rock AFB---------------	97	I 1/	Pulaski	307	293	295	0	242	270	31.9	32.6	35.8	0	40.1	46.5
U.S. Pine Bluff Arsenal------------	97	I 1/	Jefferson	1,030	1,009	904	787	570	447	28.7	29.1	29.7	30.4	32.5	38.3
Subtotal or average-------------	-	-	-	173,487	176,671	203,407	178,404	163,714	137,959	25.8	26.2	26.6	27.5	30.0	38.6
Arkansas Oklahoma Gas Corp.															
Sales to Public Authorities:															
Arkansas Childrens Colony----------	83	F	Booneville	0	0	0	NA	NA	115	0	0	0	NA	NA	44.0
Fort Chaffee-----------------------	97	F	Barling	71	82	61	NA	NA	74	29.2	29.2	31.2	NA	NA	46.0
Tuberculosis Sanatorium------------	80	F	NA	97	155	123	NA	NA	0	28.9	28.8	30.8	NA	NA	0
Subtotal or average-------------	-	-	-	168	237	184	NA	NA	189	29.0	28.9	31.0	NA	NA	44.9
Mississippi River Transmission Corp.:															
Georgia Pacific Corp.----------------	24	I	Crossett	10,486	10,872	12,436	10,937	5,471	2,106	26.1	26.3	29.4	35.1	47.2	54.2
Subtotal or average-------------	-	-	-	10,486	10,872	12,436	10,937	5,471	2,106	26.1	26.3	29.4	35.1	47.2	54.2
Texas Gas Transmission Corp.:															
Arkansas Power and Light Co.---------	49	I	Helena	2,183	3,277	7,014	1,085	0	0	32.8	28.5	24.7	36.7	0	0
Subtotal or average-------------	-	-	-	2,183	3,277	7,014	1,085	0	0	32.8	28.5	24.7	36.7	0	0
State total--------------------	-	-	-	186,324	191,057	223,041	190,426	169,185	140,254	NAp	NAp	NAp	NAp	NAp	NAp

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NA Not available. NAp Not applicable.

1/ Firm sales in 1971, 1972 and 1973.

2/ Formerly Continental Oil Co.

3/ Formerly Columbia Carbon Co.

4/ Formerly Arkansas Grain Corp.

Table 4.--Main line sales to industrial users, by State, 1968-73

Colorado

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Colorado Interstate Corp.:															
Atlantic Richfield Co.--------------	13	I	Washington County	0	26	33	31	12	1	0	21.6	21.6	23.1	33.6	35.7
CF&I Steel Corp.--------------------	32	F&I	Pueblo	11,970	12,947	12,964	13,634	14,305	13,155	27.3	28.1	28.1	31.8	35.7	39.0
Colorado Springs, City of-----------	91	F&I	Colorado Springs	8,336	9,231	9,600	9,282	9,689	9,739	21.6	22.6	22.6	25.7	30.7	34.1
Continental Oil Co.-----------------	13	I	Washington County	0	4	94	103	99	47	0	21.6	21.6	25.9	33.7	35.7
Great Western Sugar Co.-------------	20	F&I	Fort Morgan	1,049	1,218	1,402	1,352	1,285	1,361	22.9	23.6	28.0	30.0	33.7	38.2
Ideal Cement Co.--------------------	32	F&I	Portland	2,806	2,731	2,477	2,545	2,426	2,213	21.7	22.7	22.7	26.1	32.9	36.3
Midwest Oil Co.---------------------	13	I	Washington County	0	0	1	5	0	0	0	0	25.1	25.1	0	0
Mobil Oil Corp.---------------------	13	I	--do--	12	17	20	32	0	0	20.1	20.1	20.1	20.1	0	0
Public Service Co. of Colorado------	49	F&I	Denver	19,909	23,267	23,736	31,314	31,717	26,036	21.5	22.5	24.1	27.4	31.3	34.7
Rex Monahan-------------------------	NA	I	Washington County	0	0	0	3	5	7	0	0	0	31.7	33.6	35.7
Raymond Oil Co.---------------------	NA	I	--do--	0	0	0	5	5	0	0	0	0	31.7	33.4	0
Trinidad, City of-------------------	49	F&I	Trinidad	412	405	430	460	462	456	21.6	22.6	24.4	29.2	34.6	37.6
Subtotal or average------------	-	-	-	44,494	49,846	50,757	58,766	60,005	53,015	23.2	24.0	24.9	28.1	32.4	35.8
El Paso Natural Gas Co.:															
Chevron Oil Co.---------------------	13	I	Rio Blanco	0	0	8	124	2	.4	0	0	38.1	38.2	38.0	38.0
Loffland Brothers Co.---------------	13	I	Montrose	2	0	0	0	0	0	28.8	0	0	0	0	0
Moon Lake Electric Association, Inc.	49	I	Rio Blanco	172	257	59	13	9	130	38.0	37.8	38.1	37.7	37.9	38.0
Shell Oil Co.-----------------------	13	I	--do--	10	0	0	0	0	0	28.8	0	0	0	0	0
Union Carbide Nuclear Co.-----------	10	I	Slick Rock	1	1	1	.3	0	0	37.8	38.1	38.1	38.6	0	0
Do----------------------------------	10	I	Uravan	649	635	665	579	399	283	37.8	38.0	38.0	38.5	38.5	38.4
Vanadium Corp. of America-----------	10	I	Nucla	2	2	1	.27	0	0	38.0	38.1	38.1	39.0	0	0
Subtotal or average------------	-	-	-	836	895	734	716	410	413	37.7	37.9	38.0	38.4	38.4	38.3
Kansas-Nebraska Natural Gas Co.:															
Great Western Sugar Co.-------------	20	I	Ovid	1,156	1,763	1,937	1,348	937	935	26.8	26.9	28.0	31.7	35.7	41.4
Do----------------------------------	20	I	Sterling					557	578					38.6	44.7
Gulf Oil Corp.----------------------	13	I	Graylin	76	83	83	134	146	112	30.4	30.8	30.3	30.2	34.5	37.7
Julesburg Power Plant---------------	49	I	Julesburg	84	86	84	77	0	0	25.9	26.4	28.2	30.7	0	0
Kendall Farms-----------------------	01	OP 1/	Crook	70	64	54	70	0	53	28.2	28.7	28.3	28.2	0	38.7
Sterling Alfalfa Prod. Co.----------	01	OP	Sterling	58	52	50	53	0	0	28.2	28.7	28.2	28.2	0	0
Valley Dehyrdating Co.--------------	20	OP 1/	--do--	63	78	75	75	52	59	28.2	28.7	28.2	28.2	34.7	38.8
Sales less than 50,000 Mcf----------	NA	I	NA	0	0	0	84	0	0	0	0	0	30.5	0	0
Do----------------------------------	NA	I	NA	98	92	106	0	153	107	30.5	31.2	31.0	0	34.7	38.5
Subtotal or average------------	-	-	-	1,605	2,218	2,389	1,841	1,845	1,844	27.3	27.4	28.2	31.1	36.4	41.9
Plateau Natural Gas Co.: 2/															
Amity Land & Milling----------------	NA	I 3/	Holly	25	31	0	0	0	0	29.1	28.9	0	0	0	0
Arkansas Valley Milling-------------	NA	I 3/	Wiley	97	123	0	0	0	0	29.4	29.4	0	0	0	0
Brandon Field-----------------------	45	I	Eads	0	68	0	0	0	0	0	47.9	0	0	0	0
Burlington Power Plant--------------	49	I	Burlington	124	127	0	0	0	0	42.4	42.4	0	0	0	0
Colorado Feeds----------------------	20	I 3/	Wiley	61	82	0	0	0	0	29.7	29.4	0	0	0	0
Cortez Laundry----------------------	72	F	Cortez	14	0	0	0	0	0	56.6	0	0	0	0	0
Lamar Light Plant-------------------	49	I	Lamar	514	496	0	0	0	0	23.2	22.6	0	0	0	0
Lamar Paving Plant------------------	32	I	--do--	0.1	0	0	0	0	0	28.1	0	0	0	0	0
Montezuma Plywood Co.---------------	24	I	Cortez	249	238	0	0	0	0	34.9	35.0	0	0	0	0
National Alfalfa Mill Co.-----------	20	I 3/	Big Bend	45	45	0	0	0	0	29.6	29.4	0	0	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Colorado

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Plateau Natural Gas Co.--Continued															
National Alfalfa Mill Co.------------	20	I 3/	Bristol	73	56	0	0	0	0	29.1	29.1	0	0	0	0
Do----------------------------------	20	I 3/	Hartman	84	77	0	0	0	0	29.2	29.2	0	0	0	0
Do----------------------------------	20	I 3/	Korman	49	65	0	0	0	0	29.5	29.4	0	0	0	0
Reyher Inc.-------------------------	20	OP	McClave	98	108	0	0	0	0	29.5	29.5	0	0	0	0
Standard Alfalfa Mill Co.-----------	20	I 3/	Big Bend	5	4	0	0	0	0	35.9	29.4	0	0	0	0
Springfield Power Plant-------------	49	I	Springfield	55	59	0	0	0	0	24.3	24.3	0	0	0	0
XY Ranch Co.------------------------	NA	I 3/	Granada	118	93	0	0	0	0	29.0	29.0	0	0	0	0
Subtotal or average------------	-	-	-	1,611	1,672	0	0	0	0	29.3	29.7	0	0	0	0
State total-------------------	-	-	-	48,546	54,631	53,880	61,323	62,260	55,272	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

1/ Firm sales - 1973.

2/ Company acquired by Northern Natural Gas Co., February, 1970.

3/ Sales in 1968 were offpeak.

Table 4.--Main line sales to industrial users, by State, 1968-73

Delaware

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Eastern Shore Natural Gas Co.:															
H. P. Cannon and Son-----------------	20	I	Bridgeville	0	0	0	0	51	0	0	0	0	0	64.2	0
Dover, City of-----------------------	91	F	Dover	77	83	85	79	68	47	65.7	64.2	68.2	75.1	86.1	105.4
Do----------------------------------	91	I	--do--	0	0	0	0	0	89	0	0	0	0	0	67.9
Do----------------------------------	91	1/	--do--	309	582	507	525	123	46	33.1	33.1	38.0	46.0	54.4	54.7
General Foods Corp.------------------	20	F	--do--	90	81	86	61	52	0	75.0	83.4	85.5	124.9	150.4	0
Do----------------------------------	20	I	--do--	214	127	275	97	18	0	39.6	39.8	44.8	54.5	62.9	0
Getty Oil Co.------------------------	29	F	Delaware City	1,040	1,054	1,215	1,085	877	1,089	51.6	51.5	50.1	57.1	67.7	66.7
Do----------------------------------	29	I	--do--	65	83	238	36	0	0	48.2	48.2	49.2	52.1	0	0
International Latex Corp.------------	30	I	Dover	228	176	148	186	211	131	46.0	45.4	49.9	58.5	67.4	73.3
Do----------------------------------	30	F	--do--	23	35	34	28	31	21	66.5	65.9	70.7	82.0	86.7	117.6
Seaford, City of---------------------	91	I	Seaford	75	0	0	0	0	0	48.0	0	0	0	0	0
Stauffer Chemical Co.----------------	28	F	Delaware City	2,239	2,271	1,930	2,216	2,275	2,197	50.5	50.6	51.2	56.0	61.9	66.3
Standard Brands----------------------	20	F	Dover	9	13	13	13	13	12	66.2	67.4	71.7	78.4	84.7	91.7
Do----------------------------------	20	I	--do--	144	163	214	151	183	101	45.8	45.0	46.7	54.6	63.1	68.0
Subtotal or average--------------	-	-	-	4,513	4,668	4,745	4,477	3,902	3,733	49.5	48.9	49.9	56.6	65.2	67.5
State total---------------------	-	-	-	4,513	4,668	4,745	4,477	3,902	3,733	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

1/ Emergency gas.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Florida Gas Transmission Co.:															
Adams Packing Association, Inc.-----	20	I	Auburndale	289	456	477	467	470	338	35.2	35.0	37.4	41.5	43.4	52.8
Aluminum Co. of America-------------	33	I	Fort Meade	0	0	30	132	125	77	0	0	43.1	48.0	50.4	62.2
Basic Magnesia, Inc.----------------	32	F	Port St. Joe	16	16	0	0	0	0	62.8	57.1	0	0	0	0
Do----------------------------------	32	I	--do--	662	1,347	1,295	1,349	1,355	1,131	39.9	39.4	41.4	42.3	44.5	52.8
Borden Co., The---------------------	20	I	Plant City	2,477	2,297	2,402	2,343	2,037	1,434	36.9	37.2	46.8	63.1	52.5	59.1
Buckeye Cellulose Corp.-------------	28	I	Foley	4,170	4,338	4,557	4,976	4,130	3,521	35.9	36.6	49.0	61.1	51.5	59.0
Central Phosphates Corp.------------	28	I	Plant City	297	305	334	354	254	0	41.5	41.4	41.2	42.7	43.2	0
C. F. Chemicals, Inc. 1/ -----------	28	I	Bartow	0	0	0	833	0	0	0	0	0	62.4	0	0
Do 1/ ------------------------------	28	F	--do--	304	0	0	0	586	0	59.0	0	0	0	51.4	0
Do 1/-------------------------------	28	I	--do--	1,276	680	757	0	0	864	35.4	37.2	46.3	0	0	55.7
Do 1/-------------------------------	28	I	Plant City	0	0	0	0	241	0	0	0	0	0	51.9	0
Cities Service Co. 2/---------------	28	F	Tampa	764	780	797	793	765	0	57.8	59.2	61.3	69.6	60.5	0
Do 2/-------------------------------	28	I	--do--	2,931	3,525	3,749	4,601	3,258	0	38.6	38.6	39.1	43.1	41.9	0
Citrus Central, Inc.----------------	20	I	Ocala	0	0	0	276	147	100	0	0	0	41.5	40.7	73.8
Citrus World, Inc.------------------	20	I	Lakeland	0	0	0	692	591	498	0	0	0	41.6	43.6	53.5
Coca-Cola Co. - Foods Division------	20	I	Auburndale	509	640	731	0	0	544	37.0	40.3	40.7	0	0	55.6
Do----------------------------------	20	I	Plymouth	0	0	0	707	637	0	0	0	0	41.6	42.9	0
Cyprus Mines------------------------	NA	I	Hawthorne	22	20	0	0	0	0	53.4	51.5	0	0	0	0
Davidson Chemical-------------------	28	I	Bartow	1,112	800	1,099	0	0	0	36.9	37.8	45.8	0	0	0
Deseret Farms of Florida, Inc.------	01	F	Melbourne	1	2	2	1	2	1	58.1	59.2	60.3	69.8	65.9	69.9
Do----------------------------------	01	I	--do--	4	3	2	0.1	0	0	38.1	38.6	39.0	39.8	0	0
Dixie Lime & Stone Co.--------------	32	I	Ocala	42	50	47	49	28	1	35.0	35.0	39.0	43.8	44.5	351.1
Edgar Brick Co.---------------------	32	F	Edgar	0	0.1	0.6	1	0	0	0	59.8	60.9	61.2	0	0
Edgar Plastic Kaolin Co.------------	32	I	--do--	82	85	84	82	96	81	37.0	37.2	37.7	38.7	41.2	50.4
Farmland Industries, Inc.-----------	20	I	Lakeland	265	262	294	309	669	562	46.4	41.2	49.1	66.3	56.1	61.6
Florida Citrus Canners Coop.--------	20	I	--do--	523	579	640	0	0	0	35.7	36.6	40.7	0	0	0
Florida Hydrocarbons Co.------------	28	I	Brooker	2,966	2,686	2,758	2,450	2,988	3,647	77.6	73.9	74.7	80.2	90.0	121.6
Florida Power Corp.-----------------	49	I	Inglis	1,980	323	1,720	709	0	0	32.4	36.5	32.5	35.0	0	0
Florida Power & Light Co.-----------	49	I	E. Palatka	5,196	2,328	9,140	5,390	0	0	30.2	28.9	31.3	35.0	0	0
Fort Pierce Utilities Authority-----	49	I	Fort Pierce	1,551	1,467	1,554	1,916	1,584	1,690	34.8	35.0	43.7	60.5	48.2	56.5
Gainesville, City of----------------	91	I	Gainesville	3,580	3,963	4,647	5,355	4,797	5,318	36.3	36.7	40.3	48.3	44.3	53.1
Gardinier, Inc.------ --------------	NA	I	Tampa	0	0	0	0	0	3,087	0	0	0	0	0	46.7
Do----------------------------------	NA	F	--do--	0	0	0	0	0	775	0	0	0	0	0	70.4
W. R. Grace & Co.-------------------	32	I	Bartow	0	0	0	1,108	1,139	839	0	0	0	62.6	51.8	58.5
Homestead, City of------------------	91	I	Homestead	719	751	786	944	850	707	35.8	35.7	44.3	60.8	48.5	56.2
Hudson Pulp & Paper Co.-------------	26	F	Palatka	151	130	135	134	133	109	58.0	59.2	61.3	69.6	66.3	84.4
Do---------- -----------------------	26	I	--do--	58	89	58	54	79	22	37.0	37.2	46.4	63.3	52.6	57.6
International Minerals and Chemicals Corp.------------------------------	28	I	Bartow	0	0	0	737	0	584	0	0	0	62.4	0	58.5
Ammonia-----------------------------	28	F	--do--	331	126	0	0	0	0	56.7	57.6	0	0	0	0
Do----------------------------------	28	I	--do--	1,632	14	0	0	0	0	34.3	35.1	0	0	0	0
Bonnie------------------------------	28	I	--do--	1,110	687	608	0	683	0	37.0	37.2	46.1	0	51.8	0
Kissimmee, City of------------------	91	I	Kissimmee	514	580	723	850	769	616	35.8	35.7	46.2	60.9	48.7	56.3
Lakeland, City of-------------------	91	I	Lakeland	5,425	3,690	5,446	2,303	2,980	3,003	35.2	35.5	43.3	61.5	48.6	56.4
Lehigh Portland Cement Co.----------	32	I	Miami	0	0	1,416	2,629	2,143	1,550	0	0	54.5	61.2	51.5	58.4
Libby-McNeil & Libby----------------	20	I	Ocala	226	285	242	0	0	0	35.0	36.3	40.7	0	0	0
Marco Chemicals---------------------	28	F	Ridgewood	0	0	0	0	40	39	0	0	0	0	63.4	71.4
Meyer Goldman, Trustee--------------	NA	I	St. Cloud	5	12	5	2	0	0	34.3	35.0	41.4	43.5	0	0
National Gypsum Co.-----------------	32	I	Tampa	297	387	397	497	488	406	38.4	38.6	38.7	40.7	41.6	45.4
Orlando Utilities Commission--------	49	I	Orlando	9,042	12,529	12,142	11,638	11,728	11,024	34.2	34.3	39.1	43.2	45.2	52.8
Plymouth Citrus Products Coop.------	20	I	Plymouth	300	377	445	421	381	321	35.7	36.4	40.7	41.5	43.0	51.4
Pratt & Whitney Aircraft------------	37	F	Palm Beach Co.	51	388	291	242	125	204	134.1	60.4	65.3	72.1	126.0	89.8
Do----------------------------------	37	I	W. Palm Beach	0	12	4	0	0	0	0	44.5	45.0	0	0	0
Reedy Creek Improvement District----	91	I	Orange County	0	0	0.2	827	1,761	1,284	0	0	58.2	61.8	51.5	58.5
Sebring Utilities-------------------	49	I	Sebring	487	539	621	662	558	498	35.8	35.7	43.0	60.8	48.0	56.4
Southern Resin & Solvents-----------	28	F	Ridgewood	10	24	30	36	0	0	59.9	61.1	60.4	61.4	0	0
Starke, City of---------------------	91	I	Starke	222	225	245	266	236	234	36.9	37.2	46.0	62.3	48.4	56.5
State of Florida - Raiford Prison---	92	F	Raiford	25	33	31	34	26	22	56.1	56.1	56.2	58.2	59.5	70.1
Do-------------- -------------------	92	I	--do--	152	136	157	172	152	115	34.8	35.0	38.6	43.2	45.1	51.1
Suni-Citrus Products Corp.----------	20	I	Haines City	225	293	293	280	246	168	35.6	35.5	35.2	37.4	38.3	43.6
Swift & Co. - Acid Plant------------	20	I	Bartow	127	59	26	0	1	1	36.9	37.2	37.7	0	54.5	58.1
Swift & Co. - Bartow----------------	20	I	--do--	824	854	996	1,066	881	788	35.4	36.2	48.6	61.3	52.6	58.4
Swift & Co. - Ocala-----------------	20	I	Ocala	62	61	49	49	42	34	35.3	35.5	40.3	41.8	43.5	51.4
Tallahassee, City of----------------	91	I	Tallahassee	5,029	5,584	7,015	8,409	7,590	7,215	35.5	35.7	44.3	57.9	49.3	58.0
USS Agri Chemicals 3/ --------------	28	I	Bartow	333	175	367	1,186	0	616	36.3	36.1	36.1	45.4	0	58.4
Do 3/ ------------------------------	28	I	Fort Meade	608	395	657		754		36.3	36.2	36.1		51.4	

Table 4.--Main line sales to industrial users, by State, 1968-73 --Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Florida Gas Transmission Co.: Continued															
Vero Beach, City of----------------	91	I	Vero Beach	1,544	1,687	1,816	2,277	2,007	1,928	34.7	35.0	39.7	43.8	47.6	56.4
Wenczel Tile Co.-------------------	32	F	Tampa	0	18	28	29	27	28	0	60.0	60.4	61.4	63.4	71.4
Do---------------------------------	32	I	Tampa	0	32	49	74	69	52	0	44.5	46.4	46.2	47.5	55.5
Subtotal or average-------------	-	-	-	60,534	57,124	72,194	70,711	60,648	56,076	37.9	38.2	42.5	52.0	50.2	60.0
South Georgia Natural Gas Co.:															
Cotton Producers Assn.--------------	01	I	Live Oak	38	54	71	75	87	75	47.1	46.1	49.7	52.1	57.5	72.9
Florida Power Corp.-----------------	49	I	Ellaville	6,118	5,178	4,968	3,910	2,094	1,564	35.0	35.4	36.3	37.8	40.9	48.9
Floridin Co.------------------------	32	I	Quincy	516	617	674	674	610	700	41.0	41.0	42.7	46.0	50.5	59.2
Occidental Corp. of Florida---------	28	I	Hamilton County	1,046	1,268	1,222	1,922	1,984	2,090	40.8	40.7	42.5	45.3	50.7	58.8
Subtotal or average-------------	-	-	-	7,718	7,117	6,935	6,581	4,775	4,429	36.2	36.9	38.2	41.0	46.5	55.6
United Gas Pipeline Co.:															
Air Products and Chemicals, Inc.----	28	F	Floridatown	0	0	0	10,183	7,659	7,200	0	0	0	30.2	32.0	83.8
American Cyanamid Co.---------------	28	F	Pensacola	3,050	3,223	3,080	2,744	1,588	1,359	27.8	28.0	28.3	30.0	31.0	57.8
Escambia Chemical Corp.-------------	28	F	Floridatown	10,473	11,159	10,957	0	0	0	27.3	27.5	28.1	0	0	0
Gulf Power Co.----------------------	49	F	Pensacola	11,250	12,231	18,848	20,252	5,055	2,781	26.1	25.7	25.5	25.6	25.8	27.3
Monsanto Textiles Co.---------------	22	F	--do--	18,717	18,972	17,306	15,846	9,314	3,633	27.3	27.5	27.8	29.4	30.5	83.7
St. Regis Paper Co.-----------------	26	F	Cantonment	8,177	8,331	8,314	7,255	3,456	2,568	27.3	27.5	27.8	29.4	30.4	58.0
Reichhold Chemicals, Inc. 4/--------	28	F	Pensacola	2,424	2,711	2,481	2,076	1,263	995	27.8	28.0	28.4	30.0	30.9	85.5
U. S. Naval Air Station-------------	97	F	Corry Field	152	146	166	160	155	160	28.8	28.8	30.6	36.0	39.2	40.6
Do--------------------------------	97	F	Pensacola	2,498	2,561	2,620	2,410	2,361	2,413	26.0	25.9	27.3	31.9	34.5	35.3
Do--------------------------------	97	F	Saufley Field	137	152	156	154	144	132	28.8	28.8	30.6	36.0	39.2	40.5
Sales less than 50,000 Mcf----------	NA	NA	NA	0	0	0	14	3	0	0	0	0	40.0	40.0	0
Subtotal or average-------------	-	-	-	56,878	59,486	63,928	61,094	30,998	21,241	27.0	27.1	27.2	28.5	30.5	65.6
State total---------------------	-	-	-	125,130	123,727	143,057	138,386	96,421	81,746	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Formerly Chemicals, Inc.
2/ Formerly Tennessee Corp.
3/ Formerly Armour Agri. Chemical Co.
4/ Formerly Tenneco Chemicals, Inc.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
South Georgia Natural Gas Co.:															
Bridgeboro Lime & Stone Co.---------	32	I	Bridgeboro	151	142	0	0	0	0	47.1	47.2	0	0	0	0
Englehard Minerals & Chemicals Corp.	14	I	Attapulgus	863	912	945	920	1,053	1,013	40.8	40.8	42.6	45.6	50.8	59.0
Great Northern Paper Co.------------	26	I	Cedar Springs	1,060	1,070	762	976	1,042	888	40.8	40.8	38.9	46.4	51.0	60.2
Merck & Co., Inc.-------------------	28	I	Albany	202	236	295	353	355	380	46.3	46.2	46.0	49.2	53.4	62.0
Milwhite Co., Inc.------------------	14	I	Attapulgus	96	82	88	90	112	110	47.2	47.4	47.2	50.4	54.6	62.3
Oil-Dri Corp. of Georgia------------	28	I	Ochlocknee	0	0	0	1	246	270	0	0	0	53.7	52.2	60.2
Owens-Illinois Glass Co.------------	32	I	Clyattville	2,729	2,666	2,538	2,761	2,646	2,496	34.1	34.1	38.8	40.0	44.4	52.4
Waverly Mineral Products Co.--------	14	I	Meigs	0	0	0	486	490	468	0	0	0	49.1	53.3	61.4
Waverly Petroleum Products Co.------	50	I	--do--	391	523	525	0	0	0	45.9	45.9	46.1	0	0	0
Subtotal or average------------	-	-	-	5,492	5,631	5,153	5,587	5,944	5,625	38.3	38.6	40.9	43.7	48.6	56.9
Southern Natural Gas Co.:															
Atlantic Creosoting Co., Inc.-------	24	I	Savannah	0	51	31	21	16	7	0	35.2	38.5	45.5	51.5	46.3
Deering Milliken, Inc.--------------	22	I	LaGrange	427	405	339	0	0	0	35.0	35.1	35.0	0	0	0
Certain-teed Products Corp.---------	29	I	Savannah	262	278	258	267	179	181	34.0	34.2	36.5	46.0	46.5	46.3
Continental Can Co.-----------------	34	I	--do--	2,556	2,481	2,707	2,463	1,660	1,847	32.3	31.2	34.1	42.9	43.5	43.3
Johns-Manville Products Corp. of Ga.	32	I	--do--	80	88	105	92	68	71	33.7	33.9	37.4	46.1	49.5	46.3
Kaiser Agric. Chem. Div.------------	28	F	--do--	3,559	3,524	3,595	3,552	3,612	3,602	38.1	38.2	43.4	47.6	49.9	50.1
Do--------------------------------	28	I	--do--	1,702	1,565	1,633	1,740	1,289	1,485	33.7	32.2	34.7	47.6	46.2	48.0
Savannah Sugar Refinery-------------	20	I	--do--	1,417	1,255	1,344	1,294	897	1,226	32.5	32.7	35.6	45.5	43.5	43.3
Union Camp Corp.--------------------	26	I	--do--	8,976	6,524	5,648	2,705	3,746	5,340	29.9	28.1	29.1	35.7	36.2	45.8
West Point-Pepperell, Inc.:															
Dunson Mill-----------------------	22	I	LaGrange	52	53	58	66	57	52	34.9	35.1	36.1	44.5	48.8	48.9
Dixie Mill------------------------	22	I	--do--	53	49	61	63	51	44	35.0	35.1	36.3	44.8	48.9	48.9
Sales less than 50,000 Mcf----------	NA	I	NA	48	0	0	0	0	0	35.0	0	0	0	0	0
Subtotal or average------------	-	-	-	19,132	16,273	15,779	12,263	11,575	13,855	32.5	31.9	34.7	43.7	43.8	47.0
Transcontinental Gas Pipe Line Corp.:															
Sales less than 50,000 Mcf----------	NA	1/	NA	0	0.1	0	0	0	0	0	22.0	0	0	0	0
Subtotal or average------------	-	-	-	0	0.1	0	0	0	0	0	22.0	0	0	0	0
State total-------------------	-	-	-	24,624	21,904	20,932	17,850	17,519	19,480	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Purge and test.

Table 4.--Main line sales to industrial users, by State, 1968-73

Illinois

Company and customer	Customer SIC	Type of sale	Delivery point	Cas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Mississippi River Transmission Corp.:															
Allied Chemical Corp.	28	F	E. St. Louis	0	0	0	0	399	380	0	0	0	0	56.9	61.8
Allied Chemical and Dye Co.	28	F	--do--	472	502	478	461	0	0	46.7	46.6	48.9	54.9	0	0
Alton Box Board Co.	26	F	Alton	14	26	29	29	37	32	49.8	49.7	49.8	54.8	56.9	67.4
Do	26	I	--do--	2,971	2,654	1,977	1,042	888	148	26.0	27.2	34.1	44.5	41.9	52.9
Amax-Zinc Co.	33	F	E. St. Louis	0	0	0	0	0	216	0	0	0	0	0	63.5
American Oil Co.	29	I	Wood River	2,703	2,177	3,047	696	225	373	28.2	29.4	31.1	43.3	45.2	53.0
American Steel Foundries	33	F	Granite City	538	475	505	408	402	398	38.1	39.7	38.8	45.1	56.0	63.3
Do	33	I	--do--	121	55	54	4	1	3	37.6	38.3	37.6	45.7	62.9	52.5
American Zinc Co. of Illinois	33	F	E. St. Louis	444	453	374	234	0	0	39.0	37.4	40.1	44.5	0	0
Do	33	I	--do--	20	30	19	5	0	0	37.5	37.8	41.1	113.9	0	0
Cerro Corp.-Copper and Brass Div.	33	F	Sauget	1,080	1,124	1,142	1,082	1,156	1,062	38.8	38.3	38.1	45.0	56.2	62.9
Do	33	I	--do--	39	85	99	0	1	0	37.8	36.9	37.6	0	52.5	0
Consolidated Aluminum Corp.	33	F	Madison	0	0	0	922	916	871	0	0	0	44.1	56.5	63.1
Do	33	I	--do--	0	0	0	13	8	1	0	0	0	60.9	146.6	52.5
Dow Chemical Co.	28	F	--do--	898	976	0	0	0	0	38.8	38.0	0	0	0	0
Do	28	I	--do--	49	63	0	0	0	0	38.3	37.3	0	0	0	0
Ceneral Steel Industries, Inc.	33	F	Granite City	1,172	1,298	1,147	890	960	169	39.1	37.8	44.6	48.7	54.5	58.9
Do	33	I	--do--	104	121	56	1	.4	0	28.0	28.0	40.9	104.3	62.7	0
Granite City Decorating	NA	F	--do--	21	16	0	0	0	0	44.3	46.6	0	0	0	0
Do	NA	I	--do--	.4	0	0	0	0	0	28.0	0	0	0	0	0
Granite City Steel Co.	33	F	--do--	9,048	9,133	10,169	11,252	11,119	12,191	37.9	38.1	38.8	45.7	56.1	62.7
Do	33	I	--do--	913	819	694	517	120	291	35.0	35.8	39.8	49.4	44.6	52.4
Hill Brick Co.	32	F	E. St. Louis	6	0	0	0	0	0	85.6	0	0	0	0	0
Illinois Power Co.	49	I	Wood River	2,798	2,305	4,773	9,470	1,420	0	23.9	25.1	30.0	41.4	41.4	0
Illinois Terminal R.R.	40	F	Alton	2	2	0	0	0	0	49.8	49.8	0	0	0	0
Laclede Steel Co.	34	F	Alton and Madison	3,470	3,484	3,264	3,642	3,917	3,924	37.1	37.0	37.7	45.0	56.2	63.0
Do	34	I	--do--	696	683	552	412	12	6	32.3	32.6	34.6	43.3	54.5	52.4
Mobil Oil Co.	29	F	E. St. Louis	172	282	231	0	0	0	46.2	46.6	49.2	0	0	0
Do	29	I	--do--	15	0	0	0	0	0	28.0	0	0	0	0	0
National Lead Co. (Hoyt Plant)	33	F	Cranite City	153	147	152	155	0	0	38.5	39.0	38.6	43.2	0	0
Do	33	I	--do--	6	4	7	7	0	0	38.3	38.2	52.1	100.6	0	0
National Lead Co. (Pkg. Plant)	33	F	--do--	30	31	30	30	0	0	49.8	49.7	49.8	53.3	0	0
N.L. Industries, Inc. (Hoyt Plant)	33	F	--do--	0	0	0	0	161	151	0	0	0	0	56.5	63.2
Do	33	I	--do--	0	0	0	0	9	1	0	0	0	0	84.9	52.2
N.L. Industries, Inc (Pkg. Plant)	33	F	--do--	0	0	0	0	32	27	0	0	0	0	57.7	60.3
Nesco Steel Barrel Co.	34	F	--do--	54	55	50	51	52	0	49.8	49.7	49.9	54.3	57.9	0
Obear Nester Glass Co.	32	F	E. St. Louis	2,418	2,470	2,202	1,898	1,878	1,330	37.5	37.2	38.6	40.6	40.3	49.7
Do	32	I	--do--	31	17	1	0	5	1	28.0	28.0	27.9	0	77.9	60.8
Olin Mathieson Chemical Corp.	28	F	E. Alton	981	976	1,046	0	0	0	37.0	37.0	40.8	0	0	0
Do	28	I	--do--	680	768	382	0	0	0	29.7	30.3	37.4	0	0	0
Olin Corp.	28	F	--do--	0	0	0	1,837	1,782	1,524	0	0	0	56.9	56.9	62.7
Owens Illinois Glass Co.	32	F	Alton	3,521	3,634	3,618	0	0	0	36.9	36.5	36.5	0	0	0
Do	32	I	--do--	812	979	990	0	0	0	34.7	35.2	35.8	0	0	0
Owens Illinois, Inc.	26	F	--do--	0	0	0	3,584	3,362	3,316	0	0	0	42.4	56.1	62.9
Do	26	I	--do--	0	0	0	973	392	157	0	0	0	41.3	41.9	52.4
Pfizer, Inc.	28	F	E. St. Louis	0	0	0	251	287	291	0	0	0	54.5	56.3	62.3
Do	28	I	--do--	0	0	0	3	10	0	0	0	0	127.6	86.7	0
Charles Pfizer and Co.	28	F	--do--	278	288	285	0	0	0	39.1	38.6	38.7	0	0	0
Do	28	I	--do--	2	9	5	0	0	0	38.3	38.3	41.8	0	0	0
Phelps-Dodge Corp.	33	F	Madison	0	0	966	0	0	0	0	0	37.8	0	0	0
Do	33	I	--do--	0	0	27	0	0	0	0	0	38.8	0	0	0
Shell Oil Co.	29	I	Wood River	7,445	2,784	8,213	2,720	1,175	339	27.2	29.4	33.3	41.4	41.4	52.4
Sterline Steel Co.	34	F	Sauget	34	36	0	0	0	0	47.2	47.4	0	0	0	0
Do	34	I	--do--	1/	0	0	0	0	0	27.8	0	0	0	0	0
Union Electric Co.	49	I	Venice	9,150	4,274	6,592	8,601	1,375	0	23.9	25.1	34.6	41.6	42.0	0
Walworth Co.	34	F	E. St. Louis	35	37	0	0	0	0	49.8	49.7	0	0	0	0
Sales less than 50,000 Mcf	NA	F	NA	0	0	74	73	94	89	0	0	49.9	54.0	57.1	61.1
Subtotal or average	-	-	-	53,396	43,272	53,250	51,263	32,195	27,291	31.9	34.0	36.0	43.9	42.8	61.6

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Illinois

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Natural Cas Pipeline Co. of America:															
The New Jersey Zinc Co.	33	F	Depue	1,952	2,107	2,022	1,210	392	318	31.3	32.0	36.2	63.4	105.4	129.8
Subtotal or average	-	-	-	1,952	2,107	2,022	1,210	392	318	31.3	32.0	36.2	63.4	105.4	129.8
Panhandle Eastern Pipe Line Co.:															
Alsey Refractories Co.	32	1	Alsey	170	190	156	151	161	156	45.8	45.8	45.8	46.3	48.1	50.6
American Vitrified Prod. Co.	32	1	White Hall	246	193	80	0	0	0	45.8	45.8	44.7	0	0	0
Anderson, Clayton and Co. Foods Div.	20	1	Jacksonville	804	796	812	759	723	541	43.7	42.2	42.2	42.2	42.2	44.6
Central Illinois Light Co.	49	1	Peoria	804	805	0	•0	0	0	36.1	35.6	0	0	0	0
Commonwealth Edison Co.	49	1	Tovey	216	151	141	158	132	94	43.0	42.7	42.7	46.6	47.3	50.5
Ceneral Motors Corp.	37	1	Danville	1,602	1,697	1,369	1,407	1,638	1,620	42.8	42.9	42.8	42.8	42.8	42.8
Jacksonville, City of	91	1	Jacksonville	115	130	124	84	60	132	44.8	44.8	44.8	45.3	47.1	50.3
Logan Clay Products Co.	32	I	White Hall	0	0	0	77	0	0	0	0	0	44.0	0	0
Marblehead Lime Co.	32	I	Marblehead & Quincy	331	249	338	318	325	266	45.8	45.8	45.8	46.2	48.1	50.6
Menke Stone and Lime Co.	32	I	Quincy	69	0	0	0	0	0	45.8	0	0	0	0	0
National Distillers and Chemical Corp.	28	I	Tuscola	18,475	17,988	19,073	18,500	17,403	17,392	40.7	41.0	41.3	42.6	44.7	46.3
Sales less than 50,000 Mcf	NA	I	NA	114	155	132	188	148	134	43.4	44.8	45.1	46.5	48.2	51.2
Subtotal or average	-	-	-	22,946	22,354	22,225	21,642	20,590	20,335	41.0	41.2	41.6	42.7	44.6	46.1
Trunkline Gas Co.:															
Missouri Portland Cement Co.	32	I	Joppa	121	135	133	114	NA	0	45.8	45.8	45.8	45.8	NA	0
Subtotal or average	-	-	-	121	135	133	114	NA	0	45.8	45.8	45.8	45.8	NA	0
State total	-	-	-	78,415	67,868	77,630	74,229	53,177	47,944	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Gas sales totaled 18 Mcf.

Table 4.--Main line sales to industrial users, by State, 1968-73

Indiana

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Panhandle Eastern Pipeline Co.:															
Anchor Hocking Glass Corp.	32	I	Winchester	1,423	1,494	1,391	1,303	1,263	961	42.2	43.2	43.7	43.9	44.0	51.1
Brockway Class Corp.	32	I	Lapel	523	563	641	824	932	749	43.7	43.6	43.8	46.9	48.9	51.3
Colonial Brick Corp.	32	I	Montezuma	92	112	124	116	139	92	43.8	43.8	43.8	43.8	43.8	52.6
Dow Chemical Co. Pitman-Moore Div.	28	I	Boone	229	201	242	209	183	120	43.8	43.8	44.7	46.4	47.8	50.9
DuPont, E.I. deNemours Co.	28	I	Fortville	93	112	97	98	95	84	47.2	47.1	47.6	49.1	51.1	53.6
Do	28	I	Newport	253	225	182	163	182	383	49.2	49.5	49.9	51.1	52.5	54.7
Goodrich, B.F. Co.	30	I	Car Creek	696	764	885	1,010	1,025	699	43.8	43.8	48.1	50.0	51.7	53.8
Sales less than 50,000 Mcf	NA	I	NA	16	21	17	20	17	14	51.9	52.1	52.4	53.9	55.4	61.7
Subtotal or average	-	-	-	3,325	3,492	3,579	3,743	3,836	3,102	43.6	44.0	45.3	46.8	48.0	52.3
Texas Cas Transmission Corp.:															
American Vitrified Products	32	I	Brazil	561	334	293	0	0	0	38.2	38.8	40.9	0	0	0
Arketex Ceramic Corp.	32	I	--do--	584	448	314	328	302	320	39.1	40.1	46.9	41.4	44.7	46.1
Aver McCarel Clay Co., Inc.	32	I	Clay	89	105	21	0	0	0	44.4	42.2	84.1	0	0	0
Logan Clay Products Co.	32	I	Brazil	0	0	0	126	232	273	0	0	0	95.0	48.1	48.9
Sales leas than 50,000 Mcf	NA	I	Gibson & Clay	4	2	1	3	2	2	49.0	49.0	49.0	164.6	65.1	69.9
Subtotal or average	-	-	-	1,238	889	629	457	536	595	39.1	30.6	45.3	56.8	46.2	47.5
State total	-	-	-	4,563	4,381	4,208	4,200	4,372	3,697	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Iowa

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Natural Gas Pipeline Co. of America:															
Northern Gravel Co.------------------	32	I	Muscatine	12	15	15	13	16	14	31.3	35.0	35.0	35.0	35.0	48.5
Subtotal or average-------------	-	-	-	12	15	15	13	16	14	31.3	35.0	35.0	35.0	35.0	48.5
Northern Natural Gas Co.:															
Associated Milk Products-------------	20	I	West Union	0	0	0	122	109	98	0	0	0	44.6	47.4	54.3
Corn Belt Power Cooperative----------	49	I	Spencer	1,426	1,339	1,581	1,318	1,359	1,601	28.0	28.9	28.5	32.5	35.7	41.8
Do--------------------------------	49	I	Webster City	796	704	885	834	1,151	1,292	28.1	30.2	28.6	32.3	35.1	41.8
Darling and Co.----------------------	NA	I	Hawkeye	67	0	0	0	0	0	42.9	0	0	0	0	0
Farmland Industries, Inc.------------	20	I	Webster City	0	0	0	0	0	155	0	0	0	0	0	38.6
Do--------------------------------	20	F	Fort Dodge	7,166	6,038	7,635	0	0	0	33.4	34.3	34.4	0	0	0
Do--------------------------------	20	I	--do--	38	0	0	0	0	0	25.2	0	0	0	0	0
Do--------------------------------	20	F	Webster City	0	0	0	7,288	8,228	8,404	0	0	0	38.4	41.6	47.8
Green Products Co.-------------------	07	I	Conrad	79	66	72	0	0	0	30.7	33.0	32.7	0	0	0
Do--------------------------------	07	I	Grundy Center	0	0	0	70	58	95	0	0	0	36.4	39.2	47.9
Hydrocarbon Transportation, Inc.-----	49	F	Massena	0	52	71	80	110	112	0	49.9	56.4	62.9	64.5	68.7
Iowa Power and Light Co.-------------	49	I	Council Bluffs	6,570	4,760	3,048	3,152	0	0	24.8	25.4	25.4	29.2	0	0
Maquoketa Valley Co-op. Creamery-----	20	I	Arlington	134	126	145	0	0	0	36.0	40.7	40.6	0	0	0
W. S. Dickey Clay Mfg. Co.-----------	32	I	Fort Dodge	89	131	106	121	0	0	32.0	32.9	32.6	36.5	0	0
Do--------------------------------	32	F	--do--	296	293	310	307	0	0	44.9	46.0	45.5	49.4	0	0
Williams Brothers Pipeline Co.-------	46	I	Latimer	50	0	0	0	0	0	41.1	0	0	0	0	0
Woodward State Hospital--------------	80	I	Ogden	0	0	0	0	0	123	0	0	0	0	0	45.1
Do--------------------------------	80	I	Woodward	0	94	0	0	0	0	0	32.7	0	0	0	0
Sales less than 50,000 Mcf-----------	NA	F	NA	49	46	53	0	0	0	51.5	55.6	63.4	0	0	0
Do--------------------------------	NA	F	NA	0	0	0	0	53	0	0	0	0	0	76.5	0
Do--------------------------------	NA	I	NA	0	0	0	0	179	0	0	0	0	0	50.7	0
Do--------------------------------	NA	I	NA	89	66	195	0	0	0	42.2	59.5	42.4	0	0	0
Do--------------------------------	NA	F	NA	0	0	0	35	0	49	0	0	0	59.5	0	82.6
Do--------------------------------	NA	I	NA	0	0	0	229	0	39	0	0	0	46.2	0	98.8
Subtotal or average-------------	-	-	-	16,849	13,715	14,101	13,556	11,247	11,968	29.7	31.0	32.0	35.9	40.8	46.8
State total--------------------	-	-	-	16,861	13,730	14,116	13,569	11,263	11,982	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Arkansas-Louisiana Gas Co.:															
American Salt Co.--------------------	14	F	Rice	0	0	0	561	541	853	0	0	0	26.2	30.7	30.7
Do----------------------------------	14	I	--do--	498	563	553	0	0	0	23.2	23.1	25.4	0	0	0
Bert and Wetta Sales, Inc.-----------	20	I	Maize	53	0	0	0	0	0	20.4	0	0	0	0	0
Morton Salt Co.----------------------	14	F	S.Hutchinson	0	0	0	981	1,032	1,213	0	0	0	25.4	29.7	30.3
Do----------------------------------	14	I	--do--	724	943	954	0	0	0	22.9	22.2	25.6	0	0	0
Sales to Public Authorities:															
Winfield Power Plant---------------	49	I	Cowley	975	1,042	648	0	0	0	26.0	26.2	32.5	0	0	0
Do----------------------------------	49	F	--do--	0	0	0	870	940	1,038	0	0	0	34.0	33.8	34.0
Sales less than 50,000 Mcf---------	NA	F	NA	0	0	0	5	7	19	0	0	0	43.0	39.8	36.2
Subtotal or average-------------	-	-	-	2,250	2,548	2,155	2,417	2,520	3,123	24.3	24.0	27.6	27.7	31.5	31.7
Cities Service Gas Co.:															
Associated Companies:															
Cities Service Oil Co.-------------	29	I	Sedgwick	681	655	629	666	653	623	22.6	23.9	25.2	27.0	28.8	30.3
Do----------------------------------	29	I	Reno	454	1,114	1,438	1,440	1,413	1,499	25.3	25.2	25.2	27.2	29.2	30.9
Sales less than 50,000 Mcf---------	NA	I	NA	114	95	78	0	0	38	30.9	31.9	31.5	0	0	55.3
Do----------------------------------	NA	I	NA	20	22	20	21	0	0	33.0	33.1	32.7	32.2	0	0
Do----------------------------------	NA	I	NA	0	0	0	0	10	0	0	0	0	0	40.3	0
Do----------------------------------	NA	I	NA	0	0	0	0	47	0	0	0	0	0	37.2	0
Do----------------------------------	NA	I	NA	0	0	0	62	0	0	0	0	0	32.8	0	0
Do----------------------------------	NA	F&I	NA	0	0	0	0	0	13	0	0	0	0	0	53.3
Other Companies:															
Acme Brick Co.---------------------	32	I	Ellsworth	141	142	147	146	148	140	25.7	26.7	28.6	29.2	33.6	37.3
Do----------------------------------	32	I	Cherokee	124	136	137	141	144	137	28.0	28.7	30.8	31.9	35.3	38.9
American Oil Co.-------------------	29	F	Wilson	80	81	0	0	0	0	49.3	49.3	0	0	0	0
Do----------------------------------	29	I	--do--	1,554	1,843	358	0	0	0	24.2	23.8	26.1	0	0	0
American Petrofina Co. of Texas----	29	I	Butler	982	928	1,065	1,001	888	864	23.9	24.3	24.3	24.7	30.1	32.9
APCO Oil Corp.---------------------	29	I	Cowley	2,090	2,061	2,434	2,337	2,114	1,734	23.6	23.9	24.0	24.4	29.7	32.5
Ash Grove Cement Co.---------------	32	I	Neosho	0	0	0	2,357	2,478	2,506	0	0	0	27.7	31.0	35.5
Ash Grove Lime and Portland Cement Co.------------------------	32	I	--do--	2,784	2,276	2,125	0	0	0	24.2	25.5	25.9	0	0	0
Beech Aircraft Corp.---------------	37	I	Sedgwick	482	488	454	422	398	340	22.2	22.2	23.5	25.3	26.1	30.5
Boeing Co., The--------------------	37	I	--do--	1,252	1,274	1,159	1,137	1,114	850	21.1	21.1	24.1	24.9	25.7	32.9
Brown, Maurice L.------------------	NA	I	Greenwood	0	0	64	79	76	70	0	0	27.8	27.8	29.9	42.6
Buildex, Inc.----------------------	32	I	Franklin	262	338	338	381	663	601	25.0	26.5	27.2	30.7	31.6	36.5
Clinton Oil Co.--------------------	29	I	Barton	0	0	53	88	77	0	0	0	29.6	32.6	35.7	0
Coop. Farm Chemical Association----	28	F&I	Douglas	9,428	10,124	10,205	11,634	15,321	16,457	25.9	26.3	26.3	29.4	36.6	40.2
Dooley and Co.---------------------	NA	I	Leavenworth	0	0	0	58	74	58	0	0	0	33.4	36.8	41.1
Empire District Electric Co.-------	49	I	Cherokee	9,174	9,740	10,954	9,414	8,806	6,505	22.8	22.8	22.8	29.9	30.3	33.7
Farmland Industries, Inc.----------	28	F&I	Ford	3,945	8,830	8,382	9,725	9,625	8,845	26.0	26.5	26.5	27.7	28.0	30.2
Fell and Wolfe Oil Co.-------------	NA	I	Rice	0	0	0	51	52	0	0	0	0	29.8	33.0	0
FMC Corp.--------------------------	35	I	Douglas	712	720	719	694	732	735	24.0	24.5	26.7	27.7	31.2	34.6
Goodyear Tire and Rubber Co.-------	30	I	Shawnee	1,477	1,693	1,549	1,757	1,645	1,573	23.5	24.3	25.7	28.0	31.1	35.9
Do----------------------------------	30	F	--do--	120	111	111	157	179	168	47.3	47.9	49.2	49.1	49.0	51.8
Gulf Oil Corp.---------------------	29	I	Cherokee	14,716	7,221	2,131	925	928	846	24.8	26.1	27.6	29.2	31.5	36.2
Humbolt Brick and Tile Co.---------	32	I	Allen	158	165	145	130	134	128	27.0	28.0	30.4	32.2	36.1	40.8
Kansas Gas and Electric Co.--------	49	I	Sedgwick	7,580	15,976	16,592	17,495	19,575	21,345	21.5	22.9	23.3	24.5	24.1	27.9
Do----------------------------------	49	I	Labette	2,173	2,825	3,102	4,052	4,146	4,420	25.3	25.3	25.8	26.3	26.4	33.7
Kansas Power and Light Co.---------	49	I	Douglas and Shawnee	23,874	27,101	27,658	38,242	39,811	36,043	23.4	24.4	24.4	24.9	25.3	32.8
Lehigh Portland Cement Co.---------	32	I	Allen	1,854	2,190	961	0	0	0	24.2	25.5	26.2	0	0	0
Lincoln Grain, Inc.----------------	07	I	Atchison	0	88	81	73	82	105	0	26.8	27.1	27.3	35.0	38.9
Lone Star Cement Corp.-------------	32	I	Wyandotte	2,290	2,426	2,320	2,531	2,322	2,292	24.0	25.4	25.9	27.6	31.0	35.5
Mid-America Refining Co. Inc.------	29	I	Neosho	454	480	464	447	450	409	25.2	26.8	27.3	28.8	32.3	37.1
Mobil Oil Co./Division of Socony---	29	I	Butler	1,980	2,137	2,188	1,691	0	0	24.1	24.6	25.1	25.4	0	0
Do----------------------------------	29	F	--do--	298	320	335	242	0	0	28.8	28.8	29.2	30.1	0	0
Monarch Cement Co.-----------------	32	I	Allen	2,641	2,492	2,338	2,308	2,569	2,293	24.0	25.5	25.9	27.8	30.9	35.5
National Alfalfa Dehydrating and Milling Co.------------------	20	I	Douglas	82	68	64	69	76	70	29.1	29.4	31.7	36.1	36.5	41.1
National Distillers and Chemical Corp.------------------	28	I	Johnson	74	82	70	55	56	65	29.0	29.4	32.4	32.9	38.7	41.2
Oxford Dehydrating Co.-------------	20	I	Sumner	0	57	0	72	64	67	0	27.1	0	32.8	35.2	39.4

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Cities Service Gas Co.--Continued															
Other Companies--Continued:															
Pan American Petroleum Corp.-------	29	I	Barton	56	72	0	0	0	0	25.0	24.6	0	0	0	0
Phillips Petroleum Co.-------------	29	I	Greenwood	65	0	0	0	0	0	28.1	0	0	0	0	0
Phillips Pipeline Co.--------------	46	F	Franklin	76	62	68	78	79	94	35.2	35.2	35.2	35.2	45.2	48.5
Do---------------------------------	46	I	Franklin, Johnson and Greenwood	104	103	95	108	103	99	33.6	34.7	35.8	36.7	37.3	38.7
Do---------------------------------	46	I	Johnson and Greenwood	182	155	155	156	170	185	33.7	35.0	36.0	37.0	37.4	38.7
Do---------------------------------	46	I	Butler and Sedgwick	284	244	260	230	259	200	31.5	32.7	33.6	34.8	35.2	36.4
Ramsey Dehydrating Co.-------------	20	I	Leavenworth	69	0	0	0	0	0	29.2	0	0	0	0	0
Terra Resources, Inc. 1/-----------	29	I	Sumner	294	288	285	272	218	183	23.6	23.7	26.5	26.6	32.0	36.1
Universal Atlas Cement Co., Division of U. S. Steel Corp.----	32	I	Montgomery	1,985	1,244	1,630	2,585	2,489	2,349	24.8	25.7	26.0	27.5	31.0	35.7
Vickers Refining Co.---------------	29	I	Butler	751	732	87	0	0	0	24.1	24.4	24.9	0	0	0
Walker Products, Inc.--------------	NA	I	Lincoln	0	0	0	63	71	84	0	0	0	33.1	34.7	38.9
Western Alfalfa Corp.--------------	01	I	Butler	65	65	53	69	71	69	26.8	26.8	29.4	34.0	35.0	39.2
Do---------------------------------	01	I	Wilson	72	65	63	86	66	0	29.3	29.4	31.6	35.6	37.0	0
Do---------------------------------	01	I	Douglas	80	61	52	60	60	59	28.7	29.0	31.4	35.6	36.7	40.6
Do---------------------------------	01	I	Sumner	0	78	80	96	78	74	0	26.7	29.0	33.5	34.9	39.3
Western Petrochemical Corp.--------	28	I	Neosho	395	416	431	465	433	422	24.7	25.8	27.2	28.8	32.3	37.1
Western Power Division of Central Telephone and Utilities Corp.----	49	I	Ford	0	2,688	2,285	2,486	2,486	2,486	0	22.6	22.6	24.0	24.5	26.9
William Brothers Pipeline Co.------	46	I	Allen	154	167	180	170	163	173	25.8	26.4	29.7	30.8	34.7	37.8
Sales less than 50,000 Mcf---------	NA	F&I	NA	232	193	208	112	572	734	41.1	40.7	41.3	44.0	44.6	46.5
Do---------------------------------	NA	I	NA	205	215	237	351	693	644	37.9	38.4	38.8	37.2	39.6	53.5
Do---------------------------------	NA	F&I	NA	525	461	444	409	0	0	32.5	35.4	36.3	39.2	0	0
Do---------------------------------	NA	I	NA	670	618	574	355	0	0	34.0	34.0	33.5	36.1	0	0
Sales to Public Authorities:															
Burlingame, City of----------------	49	I	Osage	0	0	0	0	0	54	0	0	0	0	0	38.3
Chanute, City of-------------------	49	I	Neosho	772	812	831	874	820	742	24.3	25.9	26.6	26.5	31.6	31.2
Garnett, City of-------------------	49	I	Anderson	128	133	124	124	116	114	28.0	30.0	30.8	30.8	36.1	35.6
Iola, City of----------------------	49	I	Allen	102	126	161	169	168	185	26.2	27.7	27.9	27.9	32.5	32.3
Kansas State Penitentiary----------	92	I	Leavenworth	263	246	230	230	242	223	24.0	24.2	24.4	24.4	31.3	30.2
Neodesha, City of------------------	49	I	Wilson	127	140	164	212	234	232	28.0	29.9	30.0	29.1	33.8	33.4
Osage, City of---------------------	49	I	Osage	99	110	128	126	124	125	28.4	28.1	29.1	31.0	36.1	35.5
State Department of Social Welfare-	92	F&I	Shawnee	63	60	61	54	0	55	29.8	30.2	30.1	31.0	0	30.2
U.S.A. Department of the Air Force-	97	F&I	--do--	760	800	827	815	987	578	34.7	34.0	33.5	34.2	31.6	36.1
Do---------------------------------	97	I	Sedgwick	269	313	327	316	247	191	22.7	22.4	22.4	22.4	22.8	23.4
Do---------------------------------	97	F	--do--	113	120	129	123	121	108	43.2	43.2	43.2	43.2	43.2	43.2
U.S.A. Department of the Army------	97	F	Leavenworth	749	763	751	758	838	765	31.2	31.2	31.2	31.2	31.2	31.2
Do---------------------------------	97	I	Johnson	895	958	1,121	874	195	0	22.3	22.3	22.2	22.4	23.5	0
Do---------------------------------	97	I	Leavenworth	145	156	146	140	134	124	23.3	23.2	23.3	23.4	23.4	23.5
U.S.A. Department of Justice-------	92	I	--do--	274	313	307	311	293	265	23.9	23.6	23.7	23.7	23.8	24.0
U.S.A. Department of the Navy------	97	I	Johnson	229	271	146	59	75	0	21.9	21.9	22.0	24.4	22.3	0
U.S.A. Veterans Administration Center---------------------------	94	I	Leavenworth	169	182	170	180	174	153	25.0	24.9	25.2	26.9	30.2	30.2
Sales less than 50,000 Mcf---------	NA	F&I	NA	0	0	0	12	238	217	0	0	0	38.7	41.5	40.6
Do---------------------------------	NA	F&I	NA	179	191	191	0	0	0	39.3	38.9	39.4	0	0	0
Do---------------------------------	NA	F&I	NA	10	11	15	0	0	0	48.6	48.6	48.2	0	0	0
Do---------------------------------	NA	F&I	NA	0	0	0	208	0	0	0	0	0	40.3	0	0
Do---------------------------------	NA	F	NA	0	0	0	0	3	0	0	0	0	0	12.4	0
Subtotal or average------------	-	-	-	105,660	119,931	113,884	125,836	129,890	123,825	24.4	25.0	25.2	26.7	28.4	33.3
Kansas-Nebraska Natural Gas Co., Inc.:															
Amoco Pipeline Co.-----------------	46	I	Herndon	117	116	117	99	131	148	25.4	25.5	25.4	28.3	29.8	32.3
Cargill, Inc.----------------------	14	I	Pawnee Rock	137	196	218	204	165	0	22.4	24.2	24.0	26.5	28.7	0
Central Kansas Electric Coop., Inc.--	49	I	Dundee and Great Bend	837	933	963	939	235	0	20.1	20.1	20.1	20.1	20.7	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Kansas-Nebraska Natural Gas Co., Inc.--Con.															
Central Kansas Power Co.	49	I	Atwood, Colby, Hoxie & Hill City	4,323	3,826	4,981	0	0	0	22.2	22.2	21.9	0	0	0
Do	49	I	Atwood, Colby, Hoxie Hill City, Hays, Wakeeney	0	0	0	5,689	0	0	0	0	0	24.0	0	0
Do	49	I	Hays, Colby, Wakeeney, Hill City	0	0	0	0	4,814	4,224	0	0	0	0	26.4	29.2
Colby Power Plant	49	I	Colby	0	0	0	270	0	0	0	0	0	25.7	0	0
Consumers Refinery Association, Inc.	29	I	Phillipsburg	1,510	1,415	1,570	1,727	1,930	2,100	22.4	22.4	22.4	24.7	26.9	29.9
Hill City Power Plant	49	I	Hill City	0	0	0	133	126	117	0	0	0	27.5	30.0	33.1
Kansas TB Sanatorium	80	I	Norton	0	0	0	75	78	80	0	0	0	28.8	30.9	33.8
National Alfalfa Dehydrating and Milling Co.	07	OP	Deerfield	88	115	112	121	0	0	24.0	24.0	24.0	26.2	0	0
Norton Power Plant	49	I	Norton	0	0	0	194	204	211	0	0	0	26.5	28.7	31.7
Oakley Power Plant	49	I	Oakley	0	0	0	141	0	0	0	0	0	27.2	0	0
Oberlin Power Plant	49	I	Oberlin	0	0	0	112	0	0	0	0	0	28.1	0	0
Protein Processors	28	F	Dundee	0	0	0	0	0	56	0	0	0	0	0	32.7
Royal Brand Roofing Co.	29	I	Phillipsburg	140	171	223	237	299	308	24.9	24.4	23.9	26.0	28.1	30.9
Sharon Springs Power Plant	49	I	Sharon Springs	0	0	0	53	0	0	0	0	0	28.9	0	0
St. Francis Power Plant	49	I	St. Francis	0	0	0	92	0	0	0	0	0	28.4	0	0
Stockton Power Plant	49	I	Stockton	0	0	0	106	0	0	0	0	0	28.2	0	0
Western Alfalfa Corp.	01	OP	Deerfield	279	337	371	0	0	0	24.0	24.0	24.0	0	0	0
Do	01	OP	Holcomb, Deerfield	0	0	0	351	0	0	0	0	0	26.2	0	0
Do	01	F	--do--	0	0	0	0	431	383	0	0	0	0	28.8	32.5
Wheatland Electric Coop.	49	I	Scott City	374	616	587	641	647	640	23.2	22.8	22.8	25.1	27.4	30.5
Less than 50,000 Mcf	NA	I	NA	0	0	0	0	23	0	0	0	0	0	33.0	0
Do	NA	I	NA	0	0	0	107	0	0	0	0	0	29.2	0	0
Do	NA	I	NA	148	146	157	0	0	25	27.1	26.8	26.9	0	0	35.0
Sales to Public Authorities: 2/															
Colby Power Plant	49	I	Colby	219	215	265	0	0	0	24.0	24.0	23.7	0	0	0
Hill City Power Plant	49	I	Hill City	109	115	132	0	0	0	25.8	25.5	25.2	0	0	0
Kansas TB Sanatorium	80	I	Norton	76	76	75	0	0	0	26.5	26.4	26.4	0	0	0
Norton Power Plant	49	I	--do--	157	165	189	0	0	0	24.7	24.6	24.3	0	0	0
Oakley Power Plant	49	I	Oakley	121	126	137	0	0	0	25.5	25.4	25.1	0	0	0
Oberlin Power Plant	49	I	Oberlin	99	103	107	0	0	0	26.1	25.9	25.9	0	0	0
St. Francis Power Plant	49	I	St. Francis	78	82	92	0	0	0	26.4	26.3	26.2	0	0	0
Stockton Power Plant	49	I	Stockton	75	79	90	0	0	0	26.3	26.3	26.0	0	0	0
Subtotal or average	-	-	-	8,887	8,832	10,386	11,291	9,083	8,292	22.7	22.7	22.5	24.4	26.9	30.0
Natural Gas Pipeline Co. of America:															
American Petrofina Co. of Texas	28	I	Barton County	3	3	2	1	2	2	32.1	35.0	37.9	45.8	35.4	47.2
General Finance, Inc.	32	I	Cloud County	249	249	250	24	0	0	28.5	33.5	35.0	35.0	0	0
National Oil Co.	28	I	Barton County	0	0	0	3	2	1	0	0	0	35.0	37.5	35.0
Sunray DX Oil Co.	28	I	--do--	2	2	3	0	0	0	30.8	35.0	35.0	0	0	0
Subtotal or average	-	-	-	254	254	255	28	4	3	28.5	33.5	35.0	35.4	36.2	45.4
Northern Natural Gas Co.:															
Hydrocarbon Transportation, Inc.	49	F	Miltonvale	0	0	0	0	0	43	0	0	0	0	0	105.9
Do	49	I	--do--	52	64	0	0	142	32	32.8	32.2	0	0	36.2	48.3
Do	49	F	Greenleaf	0	0	0	0	75	0	0	0	0	0	47.0	0
Do	49	I	--do--	53	47	0	0	0	2	33.1	33.3	0	0	0	48.3
Do	49	F	Beverly	0	0	0	0	0	51	0	0	0	0	0	100.1
Do	49	I	--do--	43	48	0	0	106	37	35.1	34.0	0	0	37.8	45.4
Do	49	I	Miltonvale, Greenleaf, Beverly	0	0	182	113	0	0	0	0	33.1	37.5	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Northern Natural Gas Co.--Continued															
Northern Gas Products Co.	29	F	Barton County	0	0	0	0	24,297	26,901	0	0	0	0	51.0	59.8
Do	29	F	Bushton	13,256	14,448	20,530	21,547	0	0	46.0	52.2	45.7	50.5	0	0
Northern Helex Co.	28	F	--do--	816	896	805	807	791	0	28.0	28.1	28.0	27.9	31.7	0
Sales less than 50,000 Mcf	NA	I	NA	1	0	0	0	0	0	49.7	0	0	0	0	0
Subtotal or average	-	-	-	14,221	15,503	21,517	22,467	25,411	27,066	45.9	50.6	44.9	49.6	50.2	59.9
Panhandle Eastern Pipe Line Co.:															
Phillips Pipe Line Co.	46	I	Paola, Sharpe	451	397	417	373	364	289	40.7	40.7	40.7	40.7	40.7	42.1
Sales less than 50,000 Mcf	NA	I	NA	27	37	31	27	2	5	40.7	40.7	40.7	41.4	43.2	46.6
Subtotal or average	-	-	-	478	434	448	400	366	294	40.7	40.7	40.7	40.8	40.7	42.2
Plateau Natural Gas Co.: 3/															
Anadarko Production	13	I	Cheney	2,833	2,623	0	0	0	0	20.3	20.4	0	0	0	0
Barton Salt Co.	14	I	Hutchinson	705	758	0	0	0	0	21.1	21.1	0	0	0	0
Carey Salt Co.	14	I	--do--	909	916	0	0	0	0	21.5	21.1	0	0	0	0
Cessna Aircraft	37	I	--do--	130	146	0	0	0	0	20.6	20.9	0	0	0	0
Cities Service	13	I 4/	Cheney	491	521	0	0	0	0	20.5	20.9	0	0	0	0
Goodland Power Plant	49	I	Goodland	241	266	0	0	0	0	28.6	28.6	0	0	0	0
Great Western Sugar	20	I	--do--	663	943	0	0	0	0	25.2	25.4	0	0	0	0
Kansas Ind. Reform	92	I	Hutchinson	81	89	0	0	0	0	19.5	20.7	0	0	0	0
Kantor Oil Co.	13	I	--do--	46	46	0	0	0	0	23.2	23.4	0	0	0	0
Packaging Co. of America	34	I	--do--	930	1,004	0	0	0	0	21.2	21.1	0	0	0	0
Phillips Pipeline Co.	46	I	--do--	133	130	0	0	0	0	24.8	25.2	0	0	0	0
Pioneer Co-op	07	I	Ulysses	249	273	0	0	0	0	20.4	20.4	0	0	0	0
Prairie States Const.	16	I	Goodland	0	50	0	0	0	0	0	30.4	0	0	0	0
Johnson Power Plant	49	I	Johnson	43	49	0	0	0	0	24.0	23.9	0	0	0	0
S & K Oil Co.	13	I	Hutchinson	71	75	0	0	0	0	25.1	25.1	0	0	0	0
Skelly Oil Co.	13	I	--do--	54	50	0	0	0	0	25.1	25.2	0	0	0	0
U.S.A.F. Base	97	I	--do--	18	0	0	0	0	0	25.4	0	0	0	0	0
Vulcan Materials	34	F	Cheney	2,349	2,479	0	0	0	0	22.6	22.6	0	0	0	0
Sales less than 50,000 Mcf	NA	I 4/	NA	120	117	0	0	0	0	28.0	28.8	0	0	0	0
Do	NA	I	NA	128	143	0	0	0	0	22.6	24.3	0	0	0	0
Subtotal or average	-	-	-	10,194	10,678	0	0	0	0	21.9	22.1	0	0	0	0
Union Gas System, Inc.: 5/															
Archer-Daniels-Midland Co.	20	I	Fredonia	394	NA	NA	NA	NA	NA	24.3	NA	NA	NA	NA	NA
Burlington, City of	91	I	Burlington	77	NA	NA	NA	NA	NA	30.0	NA	NA	NA	NA	NA
Caney Valley Electric Coop.	49	I	Sedan	71	NA	NA	NA	NA	NA	30.1	NA	NA	NA	NA	NA
Coffeyville, City of	91	I	Coffeyville	1,327	NA	NA	NA	NA	NA	24.3	NA	NA	NA	NA	NA
Coop. Refinery Association	29	F	--do--	3,300	NA	NA	NA	NA	NA	27.6	NA	NA	NA	NA	NA
Delco Remy, Div. of G. M.	37	I	Olathe	377	NA	NA	NA	NA	NA	30.2	NA	NA	NA	NA	NA
Excelsior Brick Co.	32	I	Fredonia	214	NA	NA	NA	NA	NA	26.9	NA	NA	NA	NA	NA
Farmland Industries	20	F	Wyandotte	52	NA	NA	NA	NA	NA	38.3	NA	NA	NA	NA	NA
General Portland Cement Co.	32	I	Fredonia	1,830	NA	NA	NA	NA	NA	24.4	NA	NA	NA	NA	NA
Griffin Wheel Co.	37	I	Wyandotte County	122	NA	NA	NA	NA	NA	29.6	NA	NA	NA	NA	NA
National Alfalfa Co.	01	OP	Various	185	NA	NA	NA	NA	NA	29.9	NA	NA	NA	NA	NA
Olin Dixon Manufacturing Co.	28	F	Coffeyville	72	NA	NA	NA	NA	NA	36.9	NA	NA	NA	NA	NA
Ozark Smelting Co.	34	I	--do--	765	NA	NA	NA	NA	NA	24.7	NA	NA	NA	NA	NA
Tobin Construction Co.	15	I	Wyandotte County	52	NA	NA	NA	NA	NA	39.1	NA	NA	NA	NA	NA
Williams Brothers	46	I	Montgomery County	95	NA	NA	NA	NA	NA	29.6	NA	NA	NA	NA	NA
Sales less than 50,000 Mcf	NA	F	NA	238	NA	NA	NA	NA	NA	44.0	NA	NA	NA	NA	NA
Subtotal or average	-	-	-	9,171	NA	NA	NA	NA	NA	27.0	NA	NA	NA	NA	NA
State total	-	-	-	151,115	158,180	148,645	162,439	167,274	162,603	NAp	NAp	NAp	NAp	NAp	NAp

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NA Not available. NAp Not applicable. 1/ Formerly CRA, Inc.

2/ Sales to public authorities are not reported separately on Form 2 for years 1971, 1972, and 1973.

3/ Plateau Natural Gas Co. acquired by Northern Natural Gas Co. in February, 1970. 4/ Firm sales in 1968.

5/ The Federal Power Commission has granted Union Gas System, Inc. limited relief from its reporting obligations. The company did not file a report for the years 1969, 1970, 1971, 1972, and 1973.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Inland Gas Co., Inc.:															
Air Products and Chemicals	28	F	Ashland	71	15	0	0	0	0	44.0	44.0	0	0	0	0
Armco Steel Corp.	33	F	--do--	6,536	7,758	6,929	6,533	0	0	39.7	39.7	39.7	47.5	0	0
Do	33	F	Boyd County	0	0	0	0	6,036	6,217	0	0	0	0	48.7	49.2
Ashland Asphalt Paving Co.	29	F	Ashland	0	0	0	0	63	86	0	0	0	0	55.1	55.3
Cline Brick Co.	32	F	Princess	131	131	131	137	0	0	42.0	42.0	42.0	52.7	0	0
Do	32	F	Boyd County	0	0	0	0	145	138	0	0	0	0	53.7	54.4
General Refractories Co.	32	F	Hitchins	0	0	0	0	405	429	0	0	0	0	56.7	56.8
Do	32	F	Olive Hill	863	986	761	638	0	0	44.0	42.1	42.1	60.7	0	0
Kentucky Electric Steel Co.	33	F	Boyd County	0	0	0	0	289	378	0	0	0	0	53.0	53.7
Do	33	F	Ashland	230	244	265	331	0	0	41.7	41.0	41.1	51.8	0	0
A. C. Lawrence Leather Co.	31	I	--do--	0	0	0	0	100	107	0	0	0	0	53.8	54.5
Louisville Fire Brick Co.	32	F	Grahn	176	160	127	135	116	153	44.0	44.3	48.0	52.2	54.1	54.5
National Mine Service Co.	10	F	Boyd County	0	0	0	0	38	34	0	0	0	0	61.1	61.6
Do	10	F	Ashland	39	41	40	37	0	0	44.0	47.6	52.6	57.5	0	0
Sales less than 50,000 Mcf	NA	F	NA	76	77	89	48	0	80	44.0	46.6	51.3	55.2	0	57.7
Do	do	F	--do--	0	0	53	169	61	0	0	0	46.9	54.5	57.6	0
Subtotal or average	-	-	-	8,122	9,412	8,395	8,028	7,253	7,622	40.5	40.2	40.4	49.1	49.8	50.3
Texas Gas Transmission Corp.:															
Agrico Chemical Co.	28	I	Henderson	0	0	0	0	385	163	0	0	0	0	46.5	48.9
Olin Corp.	28	I	Meade County	0	0	0	1,769	1,625	1,712	0	0	0	39.6	44.1	45.3
Olin Mathieson Chemical Corp.	28	I	--do--	1,875	1,177	2,457	0	0	0	34.3	34.6	37.0	0	0	0
Spencer Chemical, Division of Gulf Oil Corp.	28	I	Henderson	269	731	472	0	0	0	33.6	35.7	36.6	0	0	0
Westvaco Corp.	28	F	Graves County	0	0	1,456	3,581	4,033	3,649	0	0	55.8	38.0	38.5	41.0
Willchemco, Inc.	28	I	Henderson	0	0	0	466	0	0	0	0	0	40.6	0	0
Subtotal or average	-	-	-	2,144	1,908	4,385	5,816	6,043	5,524	34.2	38.0	43.2	38.7	40.5	42.6
State total	-	-	-	10,266	11,320	12,780	13,844	13,296	13,146	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Arkansas-Louisiana Gas Co.:															
AMF Beaird, Inc.----------------------	35	I 1/	Caddo	253	260	227	215	244	0	26.3	28.7	34.6	34.6	34.6	0
Athens Brick Co.----------------------	32	I 1/	--do--	165	166	156	157	149	154	26.1	26.2	32.0	34.6	34.6	37.7
Calumet Refining Co.------------------	29	I 1/	--do--	204	317	380	380	371	305	26.0	26.7	34.2	34.6	34.6	37.6
Cities Service Oil Co.----------------	29	F	Bossier	0	0	0	58	71	80	0	0	0	34.7	34.7	38.7
Do----------------------------------	29	I	Claiborne	54	52	0	0	0	0	26.2	25.8	0	0	0	0
Claiborne Gasoline Co.----------------	29	I 1/	--do--	352	314	144	80	114	73	11.3	12.9	14.3	14.2	13.1	24.6
Commercial Solvents Corp.-------------	28	I 1/	Ouachita	9,914	13,588	12,968	11,559	11,322	11,218	23.5	23.5	24.0	24.2	25.7	28.7
Dixie Brick Co.-----------------------	32	I 1/	Bienville	69	66	62	62	56	71	27.1	27.2	32.6	34.7	34.7	38.6
Ford Motor Co.------------------------	37	I 1/	Caddo	131	187	181	184	0	0	26.7	26.4	34.7	34.6	0	0
Cabbs Exploration Co.-----------------	13	I	Bossier	0	0	96	0	0	0	0	0	34.7	0	0	0
General Electric Co.------------------	36	F	Caddo	0	0	0	69	86	93	0	0	0	27.4	34.7	37.6
Getty Oil Co.-------------------------	29	I 1/	Bossier	121	178	170	194	0	51	26.1	26.1	26.1	30.4	0	40.7
Gould, Inc. 2/------------------------	NA	F	Caddo	0	0	0	0	158	135	0	0	0	0	34.7	37.1
International Paper Co.---------------	26	I 1/	Morehouse	13,474	13,019	12,438	11,189	10,011	7,031	23.4	23.4	23.8	24.1	25.4	28.4
Joslyn Mfg. and Supply Co.------------	32	I	Bossier	53	0	0	0	0	0	27.7	0	0	0	0	0
Kansas City So. Ry. Co.---------------	40	I	Caddo	73	65	58	0	0	0	26.9	27.0	34.7	0	0	0
Laurens Glass, Inc.-------------------	32	I 1/	Lincoln	256	616	802	905	954	1,287	24.5	24.4	26.1	30.7	30.4	30.7
Libby Owens Ford Glass Co.------------	32	I 1/	Caddo	2,113	2,735	2,037	1,338	0	0	25.3	25.8	26.2	33.0	0	0
Mid Valley P.L. Co.-------------------	46	I 1/	Bossier	0	59	139	137	112	130	0	27.0	27.0	30.2	34.7	39.5
Olinkraft, Inc.-----------------------	26	F	Union	0	0	0	171	255	283	0	0	0	37.0	37.1	37.0
Riley Beaird, Inc. 3/-----------------	35	F	Caddo	0	0	0	0	0	249	0	0	0	0	0	37.5
Ruston, City of - Power Plant---------	49	I 1/	Lincoln	1,051	1,151	1,206	1,177	1,212	947	21.5	21.6	28.7	28.7	29.8	29.7
Santiam Southern Co.------------------	NA	I 1/	--do--	259	257	255	283	308	292	24.6	24.5	28.7	34.6	34.6	37.3
Sklar Producing Co., Inc.-------------	NA	I	Claiborne	52	53	50	0	0	0	26.3	26.2	26.5	0	0	0
Sklar and Phillips Oil Co.------------	NA	F	--do--	0	0	0	0	0	52	0	0	0	0	0	39.0
Southwestern Electric Power Co.-------	49	I 1/	Caddo	8,021	9,551	9,918	7,089	6,337	6,150	25.6	24.9	26.1	26.4	27.7	52.2
Standard Wood Preserves of Shreveport, Inc.-------------------	24	I 1/	--do--	60	63	59	54	62	0	27.5	28.7	34.7	34.7	34.7	0
Tenneco Oil Co.-----------------------	13	I 1/	--do--	0	0	62	133	0	0	0	0	34.7	34.7	0	0
UOP Process Division------------------	28	I 1/	--do--	798	835	945	795	497	526	25.6	25.6	26.8	29.7	29.7	36.5
Western Electric Co.------------------	36	I 1/	--do--	407	508	485	477	300	203	26.1	26.0	34.6	34.6	34.6	38.5
Sales less than 50,000 Mcf------------	NA	I 1/	NA	204	50	23	62	64	121	26.8	29.7	36.8	35.2	35.1	37.4
Sales to Public Authorities:															
U.S. Barksdale AFB--------------------	97	I 1/	Bossier	422	420	400	400	445	382	30.9	31.4	33.2	37.2	40.1	42.5
U.S. Louisiana Ord. Plant-------------	97	I 1/	Webster	2,174	2,065	1,938	1,452	1,559	1,418	25.5	25.5	25.5	25.5	30.0	30.0
Sales less than 50,000 Mcf------------	NA	I 1/	NA	29	28	28	26	25	24	34.2	34.8	36.8	40.4	43.3	46.2
Subtotal or average-------------	-	-	-	40,709	46,603	45,227	38,646	34,712	31,275	24.2	24.1	25.3	26.1	27.4	34.4
Mid-Louisiana Gas Co.: 4/															
Acme Brick Co.------------------------	32	F	Baton Rouge	233	220	218	212	236	229	26.1	26.1	26.1	26.1	26.3	30.6
Crown Zellerbach Corp.----------------	26	F	St. Francisville	4,045	4,147	4,154	4,125	4,328	3,636	24.4	22.8	23.5	23.2	24.1	29.7
East Louisiana State Hospital---------	80	F	Jackson	442	417	443	432	155	0	27.7	27.7	27.7	27.7	27.7	0
L.D. Ritter, Inc.---------------------	NA	F	Sicily Island	0	0	0	0	51	0	0	0	0	0	29.6	0
Enjay Chemical Co.--------------------	28	F	Baton Rouge	473	205	0	0	0	0	24.2	24.2	0	0	0	0
Humble Oil and Refining Co:															
Refinery------------------------------	29	F	--do--	480	256	550	0	0	0	24.2	24.2	24.2	0	0	0
Maryland Tank Farm--------------------	29	F	--do--	31	17	0	0	0	0	24.2	24.2	0	0	0	0
Louisiana State Penitentiary----------	92	F	Angola	648	658	646	628	231	0	27.7	27.7	27.7	27.7	27.7	0
State Industrial School for Colored Youths--------------------------	94	F	Baton Rouge	58	53	0	0	0	0	27.7	27.7	0	0	0	0
Rogers Bros. Kiln and Milling Co., Inc.	35	F	Ferriday	54	52	0	0	51	57	26.5	26.5	0	0	26.7	30.8
Sales less than 50,000 Mcf------------	NA	F	NA	92	59	127	169	81	85	27.0	29.0	27.3	27.8	28.0	31.6
Subtotal or average-------------	-	-	-	6,556	6,084	6,138	5,566	5,133	4,007	25.0	24.0	24.5	24.3	24.6	29.8
Mississippi River Transmission Corp.:															
Mid Valley Pipeline Co.---------------	46	I	Stevenson	0	11	95	89	108	16	0	31.4	34.7	39.4	41.4	52.4
Subtotal or average-------------	-	-	-	0	11	95	89	108	16	0	31.4	34.7	39.4	41.4	52.4

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Southern Natural Gas Co.:															
Sales less than 50,000 Mcf----------	NA	I	NA	34	18	23	15	17	33	30.1	27.5	32.3	39.1	47.2	44.2
Subtotal or average------------	-	-	-	34	18	23	15	17	33	30.1	27.5	32.3	39.1	47.2	44.2
United Gas Pipe Line Co.:															
Atlantic Richfield Co.--------------	29	F	Beauregard Parish	0	0	0	312	0	0	0	0	0	24.1	0	0
Atlas Processing Co. (Assoc. Co.)----	29	F	Shreveport	1,908	2,013	2,476	2,146	1,327	1,323	23.0	23.5	29.5	30.0	30.6	31.6
Billeaud Sugar Factory---------------	20	F	Broussard	0	0	0	123	177	165	0	0	0	31.5	51.5	55.2
Boise Southern Co.------------------	26	F	Beauregard Parish	0	0	0	5,693	3,330	3,196	0	0	0	24.7	24.9	25.4
Cities Service Oil Co.--------------	29	F	Lake Charles	0	0	0	36,288	19,222	17,115	0	0	0	21.4	32.5	49.3
Columbia Sugar Co.-----------------	20	F	Franklin	0	0	0	77	87	102	0	0	0	31.7	55.0	55.0
Columbian Carbon Co.----------------	28	F	Swartz	176	176	214	199	169	145	27.4	28.0	27.8	31.5	34.3	39.3
Continental Can Co., Inc.:															
Paperboard and Kraft Paper Div.----	26	F	Hodge	5,014	5,651	5,578	4,911	3,168	2,788	20.6	20.6	21.6	21.6	21.7	31.9
Coronado Oil and Minerals Co. 5/-----	29	F	Beauregard Parish	0	0	0	0	213	137	0	0	0	0	24.3	24.8
Crosby Chemicals, Inc.--------------	28	F	DeRidder	0	0	0	856	990	1,027	0	0	0	29.7	51.4	55.0
Exxon Co., U.S.A. 6/----------------	13	F	Iberia Parish	0	0	0	0	0	50	0	0	0	0	0	57.1
Frisco Cane Co., Inc.---------------	NA	F	Lions	0	0	0	78	124	138	0	0	0	27.8	30.3	32.3
General American Transportation Corp.	35	F	Goodhope	0	0	0	727	837	998	0	0	0	26.0	27.4	29.3
Georgia-Pacific Corp. 7/------------	24	F	Port Hudson	465	1,816	1,803	1,447	1,085	1,159	23.2	23.3	23.5	25.0	26.8	28.9
Grigsby Oil and Gas Co.-------------	29	F	Caddo Parish	0	73	0	0	0	0	0	31.5	0	0	0	0
Gulf States Utilities Co.-----------	49	F	Westlake	0	0	0	43,413	30,856	24,050	0	0	0	21.3	21.9	24.5
Do-------------------------------	49	F	Baton Rouge	0	0	0	44,663	36,479	17,336	0	0	0	21.2	21.8	22.5
Helvetia Sugar Cooperative, Inc.-----	20	F	St. James Parish	0	0	0	141	158	209	0	0	0	27.7	30.3	31.9
Homer, Town of----------------------	49	F	Homer Power Plant	228	247	235	244	268	267	26.1	26.5	31.5	32.0	32.7	33.6
Humble Oil and Refining Co.----------	29	F	Iberia Parish	163	791	764	1,051	495	0	25.8	25.7	26.7	28.9	32.2	0
Hunt Lumber Co., Inc.---------------	24	F	Wyatt	0	56	60	89	92	74	0	31.5	31.5	31.5	31.5	31.6
Iberia Sugar Cooperative, Inc.-------	20	F	New Iberia	0	0	0	196	222	200	0	0	0	31.4	51.5	55.0
International Paper Co.-------------	26	F	Springhill	13,079	12,601	12,886	10,861	5,498	4,861	20.6	20.6	21.6	21.6	21.7	22.2
International Salt Co.--------------	14	F	Avery Island	0	0	0	620	591	580	0	0	0	29.9	51.2	55.0
Jefferson Lake Sulphur Co.-----------	28	F	Plaquemines Parish	0	0	0	2,378	411	0	0	0	0	23.7	23.7	0
Jean of Arc Co.---------------------	20	F	Avoyelles Parish	0	0	0	0	0	51	0	0	0	0	0	55.0
Kaiser Aluminum and Chemical Corp.---	33	F	Norco	0	0	0	371	455	415	0	0	0	26.1	27.9	29.9
Kentwood Brick and Tile Mfg. Co., Inc.	32	F	Kentwood	203	212	207	0	0	0	30.2	30.5	30.8	0	0	0
Do-------------------------------	32	F	Tangipahoa Parish	0	0	0	232	239	228	0	0	0	32.4	33.5	57.6
Keyes Fibre Co.---------------------	26	F	New Iberia	0	0	0	80	80	52	0	0	0	34.3	51.3	55.0
Levert-St. John, Inc.---------------	20	F	St. Martin Parish	0	0	0	286	297	310	0	0	0	31.1	33.7	39.8
Louisiana Plywood Corp.-------------	24	F	Wyatt	332	331	406	521	575	511	25.9	26.4	27.7	29.7	31.3	36.5
Louisiana Power and Light Co.--------	49	F	Sterlington	13,392	17,413	10,117	8,102	6,515	3,982	21.8	22.8	28.2	28.4	30.1	35.7
Do-------------------------------	49	F	Westwego	0	0	0	16,253	13,692	7,988	0	0	0	22.2	22.2	28.4
Meeker Sugar Cooperative, Inc.-------	20	F	Meeker	0	0	0	158	218	183	0	0	0	31.6	53.4	55.0
Mississippi Power and Light Co. (Baxter Wilson Account)-----------	49	F	Ouachital Parish	0	0	0	2,186	0	0	0	0	0	27.5	0	0
Mobil Oil Corp.---------------------	29	F	St. Mary Parish	0	0	0	134	103	67	0	0	0	27.5	29.1	31.4
New Orleans Public Service, Inc.-----	49	F	New Orleans Market St. Power Plant	0	0	0	3,366	3,339	1,498	0	0	0	22.3	22.3	23.1
Do-------------------------------	49	F	Michoud Power Plant	0	0	0	49,296	38,832	23,369	0	0	0	22.6	22.7	23.6
Do-------------------------------	49	F	A.B. Paterson Power Plant	0	0	0	9,338	12,702	4,289	0	0	0	22.4	22.5	23.6
Ocean Protein, Inc.-----------------	20	F	Cameron Parish	0	0	0	194	0	0	0	0	0	30.5	0	0
Do-------------------------------	20	F	Terrebone Parish	0	0	0	203	0	0	0	0	0	26.4	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Louisiana

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
United Gas Pipe Line Co.--Continued															
Olinkraft, Inc.----------------------	26	F	West Monroe	8,858	8,683	8,567	7,891	4,782	4,239	20.6	20.6	21.6	21.6	21.7	22.2
Rayville, Town of--------------------	91	F	Rayville Power Plant	217	245	273	276	311	350	26.5	26.7	31.5	32.0	32.6	33.5
St. James Sugar Cooperative, Inc.----	20	F	St. James	0	0	0	205	208	199	0	0	0	27.7	29.9	32.1
St. Joe Brick Works, Inc.------------	32	F	St. Joe	121	100	97	92	87	82	30.5	31.0	31.2	32.9	34.0	58.0
Seacoast Products, Inc.--------------	NA	F	Intracoastal City	0	0	0	361	243	185	0	0	0	30.0	55.0	55.1
Shell Oil Co.------------------------	29	F	Norco	0	0	0	6,711	10,072	9,928	0	0	0	22.1	22.4	25.7
South Coast Corp., The---------------	20	F	Mathews	0	0	0	1,204	1,297	1,145	0	0	0	30.0	32.1	45.4
Do---------------------------------	20	F	Montegut	0	0	0	286	323	314	0	0	0	31.0	33.3	51.7
Do---------------------------------	20	F	Oaklawn	0	0	0	481	634	614	0	0	0	30.5	32.9	54.6
Do---------------------------------	20	F	Raceland	0	0	0	492	562	526	0	0	0	30.5	33.2	53.9
Stauffer Chemical Co.----------------	28	F	Bastrop	81	91	58	66	57	65	30.9	31.3	33.3	35.3	38.4	42.0
Sterling Sugars, Inc.----------------	20	F	Franklin	0	0	0	313	335	369	0	0	0	31.1	49.7	55.2
Texas Gulf Sulphur Co.---------------	28	F	Lafourche Parish	0	0	0	2,594	2,394	422	0	0	0	23.7	24.0	25.4
Texas Pipe Line Co., The-------------	46	F	Calcasieu Parish	0	0	0	51	0	0	0	0	0	35.6	0	0
Trappey's, B.F., Sons, Inc.----------	20	F	Lafayette	0	0	0	58	55	0	0	0	0	34.3	52.9	0
U.S. Plywood-Champion Papers, Inc.---	26	F	Holden	0	0	0	371	399	340	0	0	0	26.0	27.9	29.8
Valentine Sugars, Inc.---------------	20	F	Lockport	0	0	0	328	407	336	0	0	0	25.9	28.4	30.6
Zapata Protein, Inc. 8/--------------	20	F	Cameron Parish	0	0	0	0	133	164	0	0	0	0	54.9	55.0
Do 8/------------------------------	20	F	Terrebonne Parish	0	0	0	0	186	191	0	0	0	0	28.1	29.8
Sales less than 50,000 Mcf-----------	NA	NA	NA	298	241	174	716	524	474	34.3	35.0	38.0	40.1	45.7	48.5
Sales to Public Authorities:															
Fort Polk Army Base----------------	97	F	Leesville	0	0	0	1,032	1,061	885	0	0	0	29.2	35.2	38.8
Subtotal or average--------------	-	-	-	44,535	50,740	43,915	270,761	206,916	139,691	21.4	22.0	24.1	22.6	24.4	29.3
State total----------------------	-	-	-	91,834	103,456	95,398	315,077	246,886	175,022	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Firm sales in 1971, 1972 and 1973.
2/ Formerly Ford Motor Co.
3/ Formerly AMF Beaird, Inc.
4/ Formerly Humble Gas Transmission Co.
5/ Formerly Atlantic Richfield Co.
6/ Formerly Humble Oil and Refining Co.
7/ Formerly Louisiana Forest Products Corp.
8/ Formerly Ocean Protein, Inc.

Table 4.--Main line sales to industrial users, by State, 1968-73

Maryland

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Eastern Shore Natural Gas Co.:															
Eastern Shore Rendering Co.--------	20	I	Cambridge	51	0	0	0	0	0	41.4	0	0	0	0	0
Do-------------------------------	20	I	Easton	0	0	0	66	0	0	0	0	0	75.0	0	0
Do-------------------------------	20	I	Linkwood	0	0	0	0	60	52	0	0	0	0	77.2	84.1
Easton, City of--------------------	91	F	Easton	296	224	215	163	157	30	47.8	51.8	52.6	56.1	62.4	64.9
Do.-------------------------------	91	I	--do--	74	118	125	119	131	125	41.4	41.4	41.4	52.2	58.8	63.3
Subtotal or average-----------	-	-	-	421	342	340	348	348	207	45.9	48.2	48.5	58.4	63.6	68.8
State total-------------------	-	-	-	421	342	340	348	348	207	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Michigan

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Northern Natural Gas Co.:															
Cleveland Cliffs Iron Co.	33	F	Ishpeming	10,245	10,034	10,342	10,396	10,662	10,495	44.4	45.0	45.1	48.5	50.6	55.8
Subtotal or average	-	-	-	10,245	10,034	10,342	10,396	10,662	10,495	44.4	45.0	45.1	48.5	50.6	55.8
Panhandle Eastern Pipe Line Co.:															
Corning Glass Works	32	I	Albion	1,373	1,112	1,232	1,216	1,115	1,078	47.9	49.7	50.1	50.1	50.3	56.7
Hayes-Albion Corp.	33	I	--do--	682	693	711	689	723	619	45.8	46.5	48.2	48.0	48.1	55.7
Michigan Seamless Tube Co.	33	I	South Lyon	669	733	703	619	671	562	47.3	47.2	47.3	47.5	54.8	54.2
Mueller Brass Co.	33	I	Port Huron	536	915	900	0	0	0	48.8	48.0	49.9	0	0	0
Do.	33	I	--do--	210	0	0	0	0	0	41.7	0	0	0	0	0
Do.	33	I	Port Huron, Marysville	0	0	0	897	846	753	0	0	0	49.9	49.7	60.0
Subtotal or average	-	-	-	3,470	3,453	3,546	3,421	3,355	3,012	47.2	48.0	49.1	49.1	50.6	55.8
State total	-	-	-	13,715	13,487	13,888	13,817	14,017	13,507	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Minnesota

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Northern Natural Gas Co.:															
Armour and Co.	20	F	South St. Paul	0	59	59	56	0	0	0	65.4	66.6	76.6	0	0
Do	20	I	--do--	1,488	1,302	881	986	819	746	30.0	32.1	32.1	37.1	40.4	49.0
Brockway Glass Co.	32	F	Rosemount	642	690	694	654	649	674	42.0	42.3	42.3	46.9	50.3	56.3
Do	32	I	--do--	0	0	153	74	79	98	0	0	50.6	189.2	37.7	47.1
Dairyland Power Co-op	49	I	Twin Lakes	61	0	0	159	103	112	36.9	0	0	43.4	46.8	53.4
Erie Mining Co.	10	F	Hoyt Lakes	5,654	5,438	5,621	5,681	5,624	6,280	42.9	43.5	43.5	41.3	47.1	50.9
Eveleth Taconite Co.	10	F	Forbes	1,639	1,694	1,836	1,778	1,778	1,650	43.6	43.9	44.0	47.6	50.0	50.8
Ford Motor Co. (Boilers)	34	I	St. Paul	406	319	224	246	197	259	30.2	32.1	32.2	37.1	40.5	47.3
Ford Motor Co. (Paint Prod.)	28	I	--do--	277	209	174	147	134	144	38.2	38.3	38.5	39.7	47.1	58.8
George A. Hormel and Co.	20	F	Austin	60	64	70	76	79	75	55.3	55.3	56.2	66.3	70.0	76.2
Do	20	I	--do--	1,396	1,100	859	932	760	843	30.0	32.0	32.1	37.1	40.4	50.0
Great Northern Oil Co.	29	I	St. Paul	145	231	223	181	0	0	29.1	30.6	32.6	35.5	0	0
Hanna Mining Co. (Butler Plant)	10	F	Cooley	2,322	2,633	2,529	2,544	2,358	2,611	41.5	41.1	42.0	45.6	48.6	51.3
Hanna Mining Co. (National Plant)	10	F	Keewatin	1,647	2,630	2,996	2,994	2,471	2,371	41.8	42.5	42.0	45.7	48.6	51.3
Interstate Power Co.	49	I	Fox Lake	4,041	3,118	1,696	3,196	1,936	1,330	25.8	27.9	28.3	32.3	35.6	42.8
Koch Refining Co.	29	I	Rosemount	0	0	0	0	108	342	0	0	0	0	36.3	58.5
Minnesota Mining and Manufacturing Co.	28	F	Hastings	201	220	162	201	275	341	48.5	48.4	49.7	60.4	58.9	69.0
Do	28	I	--do--	0	0	0	0	0	119	0	0	0	0	0	52.0
Reserve Mining Co.	10	F	Silver Bay	9,239	9,175	9,216	9,052	8,627	9,111	40.8	41.6	41.6	45.3	49.5	55.5
Do	10	I	--do--	0	506	4,082	2,252	2,585	2,902	0	36.2	36.1	39.2	41.4	49.1
St. Paul Ammonia Products Co.	28	F	St. Paul	2,408	813	811	979	0	0	36.9	38.0	53.9	44.7	0	0
Do	28	I	South St. Paul	1,022	0	0	0	0	0	28.0	0	0	0	0	0
Do	28	F	Rosemount	0	0	0	0	1,124	1,100	0	0	0	0	48.5	55.9
Do	28	I	--do--	0	0	0	0	0	110	0	0	0	0	0	64.8
Swift and Co.	20	I	South St. Paul	1,154	913	177	221	123	171	29.9	32.2	31.9	37.2	40.8	52.0
United States Steel Corp.	33	F 1/	Iron Mountain	4,049	5,041	5,023	4,961	6,365	8,477	41.4	41.9	42.0	45.7	48.7	50.9
Williams Bros. Pipeline Co.	46	I	Fairbault	52	53	0	0	0	0	38.3	47.1	0	0	0	0
Sales less than 50,000 Mcf	NA	I	NA	263	307	346	192	149	160	40.5	40.8	42.8	46.2	53.0	60.0
Do	NA	F	NA	169	83	94	71	96	92	68.0	79.3	64.6	77.6	80.6	87.3
Subtotal or average	-	-	-	38,335	36,598	37,926	37,633	36,439	40,118	38.1	39.9	40.8	43.4	47.2	52.2
State total	-	-	-	38,335	36,598	37,926	37,633	36,439	40,118	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Interruptable sales in 1968.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Mid-Louisiana Gas Co.:															
Diamond National Corp.	28	F	Natchez	459	582	536	586	578	508	25.5	25.5	25.5	25.5	25.7	30.3
International Paper Co.	26	F	--do--	2,407	4,590	4,449	5,929	5,385	7,327	25.5	25.5	25.5	25.5	25.7	29.7
Johns-Manville Products Corp.	32	F	--do--	1,257	1,654	1,561	1,499	1,727	1,622	25.5	25.5	25.5	25.5	25.7	30.5
Mississippi Power and Light Co.	49	F	--do--	1,850	1,121	0	0	0	0	27.0	27.6	0	0	0	0
Do	49	F	--do--	63	0	0	0	0	0	21.0	0	0	0	0	0
Subtotal or average	-	-	-	6,036	7,947	6,546	8,014	7,690	9,457	25.9	25.8	25.5	25.5	25.7	29.9
Southern Natural Gas Co.:															
Hassie Hunt Trust	NA	I	Tinsley	58	51	0	0	0	0	31.0	31.0	0	0	0	0
Jones-O'Brien, Inc.	do	I	--do--	52	51	0	0	0	0	31.0	31.0	0	0	0	0
Marshall R. Young Oil Co.	13	I	Franklin County	71	91	0	0	0	0	33.0	33.0	0	0	0	0
Mississippi Chemical Corp.	28	F&I	Yazoo City	13,457	15,000	13,583	11,969	11,804	10,519	28.4	28.1	29.6	32.1	43.2	52.3
Mobil Oil Co.	13	I	Tinsley	52	57	0	0	0	0	31.0	31.0	0	0	0	0
Oliver Division, Sangamo Electric Co.	36	F&I	Vicksburg	60	70	70	0	0	0	35.4	35.2	39.4	0	0	0
Paymaster Oil Mill Co.	20	I	--do--	325	353	355	291	123	183	29.6	29.7	32.6	40.3	41.5	40.6
Pennzoil Producing Co.	29	I	Tinsley	342	448	537	768	904	951	31.0	31.0	31.0	39.3	40.0	40.0
Southland Oil Co.	29	I	Crupp	415	408	393	370	191	361	29.1	29.2	31.6	40.4	40.8	40.6
Triad Oil and Gas Co.	29	I	Smith County	166	222	120	92	0	0	33.0	33.0	39.7	32.7	0	0
Valley Cement Industries	32	I	Redwood	1,159	471	527	734	731	1,030	28.2	28.3	29.5	40.6	45.2	46.5
Sales less than 50,000 Mcf	NA	I	NA	76	21	25	0	0	0	32.7	32.1	34.0	0	0	0
Do	NA	F&I	--do--	0	0	0	0	312	297	0	0	0	0	41.9	41.4
Do	NA	F&I	--do--	0	0	0	358	0	0	0	0	0	40.8	0	0
Do	NA	I	--do--	386	317	460	0	0	0	31.2	31.3	31.3	0	0	0
Subtotal or average	-	-	-	16,619	17,560	16,070	14,582	14,065	13,341	28.7	28.5	29.9	33.5	43.0	50.2
Tenneco, Inc.:															
Kerr-McGee Chemical Corp.	28	F	Lowndes County	0	0	0	0	0	1,198	0	0	0	0	0	37.7
Do	28	I	--do--	879	929	994	1,067	1,116	0	31.4	32.6	32.8	37.5	38.7	0
Subtotal or average	-	-	-	879	929	994	1,067	1,116	1,198	31.4	32.6	32.8	37.5	38.7	37.7
Texas Gas Transmission Corp.:															
Mississippi Power and Light Co.	49	I	Bolivar County	3,233	3,375	2,308	4,996	4,481	4,086	25.7	26.0	26.7	28.0	30.0	31.9
Subtotal or average	-	-	-	3,233	3,375	2,308	4,996	4,481	4,086	25.7	26.0	26.7	28.0	30.0	31.9
United Gas Pipeline Co.:															
AMAX Chemical Corp., Subsidiary of American Metal Climax, Inc.	33	F	Vicksburg	0	0	0	1,008	0	0	0	0	0	30.9	0	0
Amerada Hess Corp. 1/	13	F	Purvis	0	0	0	535	364	286	0	0	0	31.3	33.4	57.6
American Metal Climax, Inc.	33	F	Vicksburg	1,173	1,230	1,279	0	0	0	28.8	29.1	29.4	0	0	0
Brookhaven Pressed Brick and Manufacturing Co.	32	F	Brookhaven	229	226	223	242	247	225	30.2	30.5	30.8	32.4	33.6	57.4
The California Co., Division of Chevron Oil	13	F	Lincoln County	0	55	0	0	0	0	0	33.5	0	0	0	0
Cities Service Oil Co.	13	F	Simpson County	0	0	67	74	60	0	0	0	36.6	43.9	56.6	0
Coastal Chemical Corp.	28	F	Pascagoula	6,277	6,340	6,685	6,030	0	0	26.3	26.6	26.9	28.4	0	0
Colonial Pipeline Co.	46	F	Covington County	1,248	1,291	1,256	1,135	1,022	386	28.8	29.0	29.3	30.9	32.1	57.7
Corchem, Inc. 2/	32	F	Pascagoula	1,004	1,389	1,672	1,263	984	1,100	28.2	28.2	28.4	29.9	31.4	57.9
Fernwood Industries	24	F	Fernwood	84	83	82	87	96	78	30.7	31.0	31.3	32.9	34.0	57.4
First Chemical Corp.	28	F	Pascagoula	321	461	760	714	681	603	30.2	30.3	30.4	31.9	33.1	57.9
Fish Meal Co.	20	F	Moss Point	0	127	115	167	67	0	0	30.7	31.1	32.6	33.8	0
Georgia-Pacific Corp.	24	F	Goss	0	0	0	126	145	161	0	0	0	35.6	37.3	39.8
Do	24	F	Taylorsville	0	0	0	110	320	427	0	0	0	38.3	39.3	42.0
Griffin Industries, Inc.	20	F	Byram	151	150	117	102	125	118	30.2	30.5	31.1	32.9	33.8	57.6
Gulf Oil Corp.	13	F	Purvis	1,050	831	658	220	0	0	29.1	29.5	30.4	31.4	0	0
Gulf Oil Corp., Chemical Department	29	F	Vicksburg	1,860	780	859	887	0	0	27.6	30.0	30.1	31.4	0	0
Gulfport Creosoting Co.	28	F	Gulfport	95	84	82	78	75	80	30.7	31.0	31.3	32.9	34.1	57.9

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery Point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
United Gas Pipeline Co.--Continued															
Haynie Products, Inc.	28	F	Moss Point	77	96	91	140	102	0	30.5	30.8	31.2	32.7	33.7	0
Hess Pipeline Co.	46	F	Wayne County	263	233	250	184	203	135	30.2	30.5	30.8	32.3	33.6	62.1
Do	46	F	Lamar County	78	82	59	81	0	0	30.9	31.2	31.9	32.9	0	0
Humble Oil and Refining Co.	13	F	Jasper/Jones Counties	94	88	85	51	0	0	33.2	33.5	35.2	45.1	0	0
International Paper Co.	26	F	Moss Point and Redwood	10,766	10,678	10,312	8,702	4,512	4,063	26.4	26.7	27.0	28.6	29.7	57.3
Keesler Air Force Base	97	F	Biloxi	1,153	1,153	1,136	1,053	1,057	0	27.6	27.7	29.4	34.7	38.1	0
Lee, Robert A., Inc., and Tyson, R. W., Producing Co., Inc.	NA	F	Jones County	113	155	189	170	132	96	30.6	30.5	30.8	32.4	33.6	57.6
Lone Star Producing Co.	13	F	Jasper/Jones Counties	130	120	113	57	103	133	33.2	33.5	34.5	45.1	58.4	60.2
Marathon Le Tourneau Co., Marine Division 3/	35	F	Glass	179	166	158	160	266	277	30.2	30.6	30.8	32.5	33.6	56.7
Marquette Cement Manufacturing Co.	32	F	Brandon	1,371	1,563	1,359	1,169	1,009	870	27.8	28.2	28.7	30.4	31.2	56.3
Masonite Corp.	24	F	Laurel	11,279	11,735	11,971	10,245	4,870	4,421	26.3	26.6	26.9	28.4	29.5	57.3
Mississippi Chemical Corp. 4/	28	F	Pascagoula	0	0	0	0	5,263	4,977	0	0	0	0	29.5	58.0
Mississippi Power Co.	49	F	Handsboro	19,855	18,588	20,592	19,666	16,084	8,415	26.3	26.5	27.2	29.0	29.8	57.9
Do	49	F	Hattiesburg	3,056	3,785	3,888	3,811	0	0	23.3	24.6	25.0	26.7	0	0
Do	49	F	Meridian	4,865	6,687	6,797	6,587	5,389	2,860	26.4	26.6	26.9	28.4	29.4	62.2
Mississippi Power and Light Co.	49	F	Jackson	15,097	18,607	18,625	16,392	12,378	8,298	25.5	25.8	26.5	28.2	30.5	34.1
Do	49	F	Vicksburg	27,394	24,332	30,034	29,207	37,015	17,066	25.6	25.8	26.6	28.7	30.3	34.4
National Aeronautics and Space Administration	96	F	Hancock County	690	685	686	669	681	0	25.9	26.0	27.1	31.6	33.4	0
Pruet, Chesley, Drilling Co.	13	F	Rankin County	73	0	0	0	0	0	36.6	0	0	0	0	0
Do	13	F	Clarke County	0	158	81	0	0	0	0	36.6	37.0	0	0	0
Do	13	F	Hinds County	0	70	0	0	0	0	0	36.6	0	0	0	0
Do	13	F	Jasper County	0	66	0	0	0	0	0	36.6	0	0	0	0
Reichold Chemicals, Inc.	28	F	Gulfport	98	113	169	159	190	200	30.7	30.8	30.8	32.4	33.6	57.8
St. Regis Paper Co.	26	F	Wanilla	4,906	6,019	5,355	4,605	2,484	2,762	26.5	26.6	26.9	28.4	29.5	59.2
Shell Oil Co.	13	F	Rankin County	0	0	299	125	0	0	0	0	37.0	38.7	0	0
Do	13	F	Walthall County	0	143	232	0	0	0	0	36.6	36.6	0	0	0
Do	13	F	Pike/Lincoln Counties	0	0	0	193	57	0	0	0	0	42.1	49.7	0
Southland Oil Co.	13	F	Lumberton	83	0	245	367	347	310	30.5	0	30.9	32.4	33.5	57.0
Do	13	F	Sandersville	374	662	644	716	676	721	30.2	30.6	31.0	32.4	34.1	60.2
South Mississippi Electric Power Association	49	F	Benndale	0	147	368	0	137	97	0	30.7	30.8	0	34.3	57.7
Do	49	F	Moselle	0	0	2,496	7,308	7,277	3,391	0	0	27.4	28.5	29.5	57.4
Standard Products Co.	30	F	Moss Point	78	97	85	136	118	123	30.5	30.7	31.2	32.7	33.7	58.1
Texaco, Inc.	13	F	Lamar County	0	0	0	61	60	59	0	0	0	45.3	58.2	60.1
Thiokol Chemical Corp.	28	F	Moss Point	223	263	250	326	315	330	30.2	30.5	30.8	32.4	33.5	58.1
Triad Oil and Gas Co.	13	F	Jones County	0	63	138	0	0	63	0	33.5	33.4	0	0	60.5
Vicksburg Chemical Co. 5/	28	F	Vicksburg	0	0	0	0	372	979	0	0	0	0	33.2	56.7
Do 6/	28	F	--do--	0	0	0	0	398	1,094	0	0	0	0	33.3	56.7
Westinghouse Electric Corp.	36	F	--do--	218	195	187	167	158	160	30.2	30.5	30.8	32.4	33.6	56.7
Zapata Protein, Inc. 7/	28	F	Moss Point	0	0	0	0	0	133	0	0	0	0	0	58.1
Sales less than 50,000 Mcf	NA	F	NA	775	399	693	455	359	265	35.5	35.5	37.4	42.7	52.6	60.1
Subtotal or average	-	-	-	116,780	120,195	131,442	125,740	106,198	65,762	26.3	26.6	27.2	29.0	30.5	48.8
State total	-	-	-	143,547	150,006	157,360	154,399	133,550	93,844	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

1/ Formerly Gulf Oil Corp.

2/ Formerly H. K. Porter Co., Inc.

3/ Formerly Le Tourneau, R. G., Inc.

4/ Formerly Coastal Chemical Corp.

5/ Formerly AMAX Chemical Co.

6/ Formerly Gulf Oil Corp., Chemicals Department, Vicksburg works.

7/ Formerly Haynie Products, Inc.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Cities Service Gas Co.:															
Ash Grove Cement Co.-----------------	32	I	Greene	969	986	1,106	891	813	899	24.6	25.7	26.7	26.9	31.9	35.3
Carter Waters Corp.------------------	32	I	Platte	466	411	328	252	266	271	24.4	26.0	26.6	30.1	32.9	38.0
Continental Aviation and Eng. Corp.--	37	I	Newton	0	52	51	0	0	0	0	30.1	30.2	0	0	0
Farmers Chemical Co.-----------------	28	I	Jasper	329	314	364	390	159	182	25.6	27.4	28.1	28.0	35.3	38.3
International Paper Co.--------------	26	I	--do--	51	0	0	0	0	54	27.5	0	0	0	0	43.8
Missouri Public Service Co.----------	49	I	Cass, Johnson and Pettis	455	1,804	2,580	1,538	1,622	1,635	27.2	27.7	27.7	29.1	29.5	32.1
Phillips Pipe Line Co.---------------	46	I	Cass	144	145	189	152	136	78	30.2	30.2	30.2	30.2	37.7	39.0
Solar Nitrogen Chemicals, Inc.-------	28	I	Jasper	4,821	5,423	5,543	5,377	4,911	5,081	26.1	26.5	26.4	27.9	28.3	31.0
Western Alfalfa Corp.----------------	20	I	Saline	101	90	90	102	100	74	28.1	30.9	31.5	35.3	36.1	40.7
Sales less than 50,000 Mcf-----------	NA	I	NA	46	13	19	3	0	0	33.4	39.9	36.2	49.3	0	0
Do-----------------------------------	NA	F&I	NA	79	111	105	168	180	170	34.6	34.0	34.3	34.5	38.7	42.7
Sales to Public Authorities:															
Board of Public Utilities of Springfield, Mo.-----------------	49	I	Greene	6,276	7,350	8,565	10,030	9,504	9,213	22.5	22.9	23.4	28.5	31.6	36.2
Missouri State School---------------	92	I	Lafayette	0	57	0	0	0	0	0	28.4	0	0	0	0
Sales less than 50,000 Mcf---------	NA	F&I	NA	55	11	0.4	56	60	51	31.9	43.7	55.9	31.9	40.2	43.4
Do------------------------------	NA	I	NA	3	2	54	0	0	0	53.0	52.9	32.0	0	0	0
Subtotal or average--------------	-	-	-	13,795	16,769	18,994	18,959	17,751	17,708	24.5	25.2	25.4	28.4	30.8	34.5
Mississippi River Transmission Corp.:															
Alpha Portland Industries, Inc.------	32	F	St. Louis Co.	10	11	15	10	17	0	49.8	49.7	49.9	54.0	56.9	0
Do-----------------------------------	32	I	--do--	1,052	1,017	922	1,214	789	0	23.9	24.9	30.5	41.8	41.5	0
American Smelting and Refining Co.---	33	I	Glover	31	106	150	148	181	0	49.8	49.7	49.8	50.0	50.1	0
J. J. Brouk and Co.------------------	32	F	St. Louis	29	36	0	0	0	0	49.8	49.7	0	0	0	0
W. S. Dickey Clay Mfg. Co.-----------	32	F	--do--	211	206	171	224	223	214	44.2	44.0	43.9	50.1	56.9	61.9
Do-----------------------------------	32	I	--do--	0	0	0	0.03	0.2	0	0	0	0	50.0	85.8	0
GAF Corp.----------------------------	28	I	Annapolis	118	134	163	213	202	0	49.8	49.7	49.8	50.0	51.7	0
Hydraulic Press Brick Co.------------	32	F	St. Louis Co.	2	2	0	0	0	0	49.8	49.7	0	0	0	0
Lenox Plastics, Inc.-----------------	30	F	St. Louis	13	14	0	0	0	0	49.7	49.7	0	0	0	0
Mississippi Lime Co.-----------------	32	F	Ste. Geneviéve	805	802	848	1,449	1,380	1,385	36.5	36.5	38.3	50.7	56.0	62.8
Do-----------------------------------	32	I	--do--	3,017	2,684	1,976	1,448	895	587	25.2	26.2	31.2	41.5	41.5	52.3
Missouri Portland Cement Co.---------	32	I	St. Louis	2,333	2,271	1,716	2,529	1,741	0	24.8	25.9	31.3	41.8	41.9	0
Missouri Rolling Mill Corp.----------	33	F	--do--	167	164	168	175	175	167	42.2	42.4	47.4	54.8	56.9	61.1
Do-----------------------------------	33	I	--do--	8	5	3	0	0	0	28.0	28.0	28.0	0	0	0
National Lead Co.--------------------	33	F	--do--	231	234	237	0	0	0	38.5	38.2	38.1	0	0	0
Do-----------------------------------	33	I	--do--	20	28	17	0	0	0	28.0	28.0	45.3	0	0	0
N.L. Industries, Inc. - Manchester Plant------------------------------	33	F	--do--	0	0	0	235	219	234	0	0	0	38.1	45.8	53.2
Do-----------------------------------	33	I	--do--	0	0	0	22	14	4	0	0	0	46.8	42.1	52.4
N.L. Industries, Inc. - Titanium Div.--------------------------------	33	F	St. Louis Co.	2,465	2,535	2,530	2,391	2,054	2,147	36.9	36.6	36.5	42.2	56.1	63.0
Do-----------------------------------	33	I	--do--	654	459	966	823	148	34	30.0	30.1	33.2	42.1	43.0	52.4
Pilot Knob Pellet Co.----------------	35	I	Pilot Knob	305	609	579	596	579	181	49.8	49.7	49.7	49.7	50.6	53.7
PPC Industries, Inc.-----------------	32	F	Crystal City	3,189	3,127	2,696	2,563	2,042	1,792	36.8	37.0	38.7	44.6	55.9	62.8
Do-----------------------------------	32	I	--do--	103	111	21	0	0	0	36.2	37.1	37.7	0	0	0
Porter, H. K. Co.--------------------	32	F	St. Louis	169	171	0	0	0	0	50.2	50.2	0	0	0	0
River Cement Co.---------------------	32	I	Crystal City	2,347	2,761	2,937	3,286	3,667	152	27.9	26.5	34.1	43.0	45.0	56.3
St. Joe Minerals Corp.---------------	33	F	Bonne Terre	821	876	828	867	733	522	49.8	49.7	50.6	56.9	56.9	62.4
St. Louis Car Co.--------------------	37	F	St. Louis	44	53	112	234	222	84	49.8	49.7	49.9	52.8	58.2	58.0
St. Louis Screw and Bolt Co.---------	34	F	--do--	65	70	0	0	0	0	44.0	46.6	0	0	0	0
Do-----------------------------------	34	I	--do--	4	0	0	0	0	0	28.0	0	0	0	0	0
Scullin Steel Co.--------------------	37	F	--do--	573	623	634	624	576	475	44.3	46.6	48.7	54.3	57.1	62.1
Do-----------------------------------	37	I	--do--	0.1	0	0	0	0	0	28.3	0	0	0	0	0
Union Electric Co. - Mound St.-------	49	I	--do--	318	34	138	170	0	0	24.1	30.1	31.4	41.5	0	0
Union Electric Co. - Meramec Plant---	49	I	--do--	2,961	2,326	3,945	3,888	149	114	24.0	25.2	33.7	42.7	43.7	54.2
Universal Metal Products-------------	34	F	Barnhart	20	26	0	0	0	0	49.8	49.7	0	0	0	0
USS Agri. - Chemicals, Inc.----------	28	F	Crystal City	3,036	2,522	14	53	279	380	36.6	36.6	49.8	56.1	57.1	62.6
Do-----------------------------------	28	I	--do--	1,599	1,229	373	379	148	0	35.4	34.8	39.7	42.1	41.6	0
Sales less than 50,000 Mcf-----------	NA	F	NA	0	0	157	90	82	215	0	0	49.6	53.8	57.3	64.7
Subtotal or average--------------	-	-	-	26,720	25,246	22,316	23,631	16,515	8,687	32.4	33.2	36.5	44.5	49.9	61.3

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Missouri

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Northern Natural Gas Co.:															
Missouri Beef Packers----------------	20	F	Phelps City	127	198	172	217	208	193	50.0	67.9	53.6	56.2	61.2	65.8
Sales less than 50,000 Mcf-----------	NA	F	Tarkio	0	0	0	0	0	22	0	0	0	0	0	80.1
Subtotal or average--------------	-	-	-	127	198	172	217	208	215	50.0	67.9	53.6	56.2	61.2	67.2
Panhandle Eastern Pipe Line Co.:															
C-E Refractories, Div. of Combustion Engineering, Inc.------------------	32	I	Farber	511	489	504	433	361	300	40.7	40.2	39.7	39.7	39.6	39.7
Columbia Brick and Tile Co.----------	32	I	Columbia	138	140	109	121	127	118	40.7	40.7	40.7	40.7	43.1	46.2
Green, A. P. Refractories Co.--------	32	I	Mexico	2,252	2,321	2,257	2,025	1,927	1,670	40.7	38.6	38.2	38.6	38.8	39.0
Harbison-Walker Refractories Co., Div. of Dresser Industries, Inc.---	32	I	Fulton and Vandalia	1,438	1,607	1,872	1,345	1,561	1,434	40.7	39.6	38.9	39.7	39.3	39.3
Hercules, Inc.-----------------------	28	I	Louisiana	3,832	3,920	4,085	3,222	3,395	2,695	38.4	38.4	38.3	38.8	38.8	39.0
Kaiser Aluminum and Chemical Corp.---	34	I	Mexico	1,440	1,429	1,402	1,189	1,326	1,161	40.7	39.9	39.6	40.0	39.7	40.0
Missouri Power and Light Co.---------	49	I	Jefferson City	177	183	168	171	203	191	36.6	37.8	40.7	40.7	40.7	46.5
Northern American Refractories Co., Div. of ELTRA Corp.----------------	32	I	Farber	305	339	350	227	290	263	40.7	40.2	39.7	39.7	39.7	39.7
Northeast Missouri Electric Power Co-op----------------------------	49	I	Palmyra	0	77	105	84	163	63	0	44.6	45.1	46.3	46.9	49.7
Phillips Pipe Line Co.---------------	46	I	Jefferson City and Leeton	195	181	208	168	168	131	40.7	40.7	40.7	40.7	40.7	44.8
Stallings, E.W.----------------------	NA	I	Cass County	50	53	0	0	75	82	40.7	40.7	0	0	43.4	46.3
Universal Atlas Cement Co., Div. of U.S. Steel Corp.----------------	32	I	Hannibal	58	53	171	153	0	237	43.8	43.8	43.8	43.8	0	46.7
Wellsville Fire Brick Co.------------	32	I	Wellsville	408	428	321	310	285	281	40.7	40.2	39.7	39.7	39.7	39.7
Sales less than 50,000 Mcf-----------	NA	I	NA	45	26	66	67	70	31	43.9	42.8	41.6	42.1	43.7	46.5
Subtotal or average--------------	-	-	-	10,849	11,246	11,618	9,515	9,951	8,657	39.9	39.1	38.9	39.4	39.4	40.0
State total-----------------------	-	-	-	51,491	53,459	53,100	52,322	44,425	35,267	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Montana

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Montana-Dakota Utilities Co.:															
Farmers Union Central Exchange-------	29	F & I	Laurel	481	598	1,494	1,787	1,614	2,027	31.5	31.5	31.5	31.9	32.7	35.1
Holly Sugar Corp.--------------------	20	I	Hardin	198	174	220	66	0	0	31.5	33.0	33.0	33.1	33.8	0
Do---------------------------------	20	I	Sidney	1,050	1,282	1,613	1,363	1,354	1,349	31.5	32.9	33.0	33.1	0	38.0
Montana Power Co.--------------------	49	I	Billings	0	0	447	456	0	0	0	0	30.9	31.1	0	0
Sam Gary Oil Producers---------------	29	I	Bell Creek	0	0	0	99	933	980	0	0	0	35.7	36.1	37.7
Shell Oil Co.------------------------	13	I	Baker Field	0	241	411	500	465	513	0	35.2	35.3	35.4	35.5	38.4
Spruce Oil Co.-----------------------	13	I	Wolf Point	87	75	56	54	52	0	33.8	33.9	34.4	35.0	35.3	0
Sales less than 50,000 Mcf-----------	NA	I	Billings	0	0	0	0	43	0	0	0	0	0	32.9	0
Do---------------------------------	NA	I	Wolf Point	0	0	0	0	0	47	0	0	0	0	0	37.2
Subtotal or average--------------	-	-	-	1,816	2,370	4,241	4,325	4,461	4,916	31.6	32.9	32.5	32.7	34.1	36.8
State total----------------------	-	-	-	1,816	2,370	4,241	4,325	4,461	4,916	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Cities Service Gas Co.:															
Ideal Cement Co.----------------------	32	I	Nuckolls	1,746	2,056	2,047	1,857	2,163	2,008	24.2	25.5	25.9	27.8	31.0	35.6
Sales less than 50,000 Mcf-----------	NA	I	NA	0	0	0.5	0.3	0.5	0.4	0	0	45.4	45.2	47.1	58.1
Subtotal or average--------------	-	-	-	1,746	2,056	2,047	1,857	2,163	2,008	24.2	25.5	26.0	27.8	31.0	35.6
Kansas-Nebraska Natural Gas Co., Inc.:															
Albers Dehydrating Co.---------------	20	OP 1/	Wisner	107	149	130	145	139	139	31.2	31.2	32.2	32.2	41.2	42.4
Al-fa Meals, Inc.--------------------	20	OP	Central City	0	51	0	0	0	0	0	31.2	0	0	0	0
Alliance Power Plant-----------------	49	I	Alliance	376	376	445	478	0	0	27.9	27.9	27.8	38.2	0	0
Allied Mills, Inc.-------------------	20	OP 1/	Cozad	267	263	268	271	218	232	31.2	31.2	32.2	32.2	41.2	42.4
Alma Power Plant---------------------	49	I	Alma	60	69	81	85	84	95	30.1	30.0	29.9	37.9	38.9	43.3
Amoco Pipeline Co.-------------------	46	I	Kimball	0	0	64	0	0	0	0	0	33.6	0	0	0
Amoco Production Co.-----------------	13	I	Kimball Co. Sloss Field	0	0	0	136	0	0	0	0	0	41.6	0	0
Assoc. Milk Producers, Inc.----------	20	I	Plainview	0	0	0	71	0	0	0	0	0	37.7	0	0
B and R Mills, Inc.------------------	07	OP 1/	Holdrege	61	69	64	61	0	58	31.2	31.2	32.2	32.2	0	42.4
Birdwood Products Co.----------------	20	OP	Hershey	55	66	58	60	0	0	31.2	31.2	32.2	32.2	0	0
Broken Bow Power Plant---------------	49	I	Broken Bow	87	98	111	118	0	0	29.8	29.7	29.6	37.6	0	0
Burwell Power Plant------------------	49	I	Burwell	73	76	83	87	0	0	29.9	29.9	29.8	37.7	0	0
Cambridge Corp.----------------------	34	OP	Cambridge	72	82	71	69	0	0	31.2	31.2	32.2	32.2	0	0
Cambridge Power Plant----------------	49	I	--do--	0	51	59	58	0	0	0	30.3	30.1	38.0	0	0
Canaday Power Plant------------------	49	I	Lexington	0	0	0	0	5,802	6,194	0	0	0	0	36.1	40.1
Central Alfalfa, Inc.----------------	01	OP 1/	Josselyn	274	282	110	264	230	272	31.2	31.2	32.2	32.2	41.2	42.4
Central Nebraska Public Power and Irrigation District----------------	49	I	Lexington	4,798	5,404	6,281	5,957	0	0	27.2	27.2	27.2	35.2	0	0
Chadron Teachers College-------------	94	I	Chadron	93	103	122	126	0	0	46.5	46.3	46.2	46.1	0	0
Chandler and Associates, Inc.--------	07	I	Kimball	0	0	0	0	106	56	0	0	0	0	43.2	47.7
Chandler Simpson, Inc.---------------	07	I	--do--	123	129	129	103	0	0	34.8	35.2	35.2	43.0	0	0
Coleridge Dehy. Co.------------------	20	OP 1/	Coleridge	0	75	61	70	77	83	0	31.2	32.2	32.2	41.2	42.4
Consolidated Blenders----------------	07	OP 1/	Odessa and Others 2/	508	569	521	530	912	1,306	31.2	31.2	32.2	32.2	41.2	42.4
Do-----------------------------------	07	OP	Darr	0	0	0	203	0	0	0	0	0	32.2	0	0
Cornhusker Farms---------------------	01	OP 1/	Abbott	102	120	112	117	116	0	31.2	31.2	32.1	32.2	41.0	0
Cornhusker Ordance Depot-------------	97	I	Grand Island	142	945	682	624	596	454	27.6	27.5	27.6	35.7	36.8	39.8
Cozad Alfalfa, Inc.------------------	01	OP 1/	Cozad	89	83	91	89	73	92	31.2	31.2	32.2	32.2	41.2	42.4
CRA, Inc.----------------------------	29	I	Scottsbluff	0	58	110	99	0	0	0	32.6	32.0	40.4	0	0
Curtis Power Plant-------------------	49	I	Curtis	0	0	0	59	0	0	0	0	0	35.5	0	0
Dawson County Feed Products, Inc.----	20	OP 1/	Brule, Lexington	346	406	393	380	365	376	31.2	31.2	32.2	32.2	41.2	42.4
Edison Dehydrating Co.---------------	20	OP	Edison	115	123	107	74	0	0	31.2	31.2	32.2	32.2	0	0
Elm Creek Alfalfa Mills, Inc.--------	20	OP 1/	Elm Creek and Darr	236	262	234	233	203	238	31.2	31.2	32.2	32.2	41.2	42.4
Elm Creek Dehy., Inc.----------------	20	OP 1/	Elm Creek	0	111	124	100	95	112	0	31.2	32.2	32.2	41.2	42.4
Farmers Coop. Dehy. Assn.------------	20	OP 1/	Lexington	139	151	138	142	122	139	31.2	31.2	32.2	32.2	41.2	42.4
Farmland Industries, Inc.------------	20	F 1/	Hastings	3,774	3,623	3,594	6,278	3,572	3,694	32.6	32.9	33.0	38.3	41.9	45.5
Do-----------------------------------	20	I	--do--	3,089	2,846	2,856	0	2,867	2,953	27.2	27.3	27.3	0	36.2	40.5
Gothenburg Alfalfa Products Co.------	20	OP 1/	Willow Island	128	138	130	125	92	83	31.2	31.2	32.2	32.2	41.2	42.4
Gothenburg Feed Products Co.---------	20	OP 1/	Gothenburg, Brady	329	301	257	287	247	282	31.2	31.2	32.2	32.2	41.2	42.4
Grand Island Power Plant-------------	49	I	Grand Island	2,023	2,181	2,259	1,992	2,480	3,713	27.3	27.3	27.3	35.3	36.3	40.7
Great Western Sugar Co.--------------	20	I	Scottsbluff	0	106	192	153	0	0	0	30.4	30.3	38.2	0	0
Green Clow Mills, Inc.---------------	07	OP 1/	Laurel	0	75	0	70	72	71	0	31.2	0	32.2	41.2	42.4
Gulf Oil Corp.-----------------------	13	I	Kenmac Lease	0	159	144	140	162	110	0	31.8	30.4	41.8	42.1	46.1
Hanna and Lamb Milling Co.-----------	07	OP 1/	Gothenburg	123	116	106	93	79	83	31.2	31.2	32.2	32.2	41.2	42.4
Haymaker Feed Co.--------------------	20	OP 1/	Darr	132	139	143	131	148	164	31.2	31.2	32.2	32.2	41.2	42.4
Hastings Power Plant-----------------	49	I	Hastings	1,309	1,447	1,583	1,699	1,807	2,033	27.4	27.4	27.3	35.4	36.4	40.8
Hastings State Hospital--------------	80	I	Ingleside	139	149	146	136	133	126	29.0	28.9	29.0	37.1	37.9	41.8
Island Dehy. Inc.--------------------	20	OP 1/	Willow Island	74	92	89	72	195	207	31.2	31.2	32.2	32.2	41.2	42.4
Kaw Dehydrating Co., Inc.------------	20	OP 1/	Brady	105	107	90	105	93	93	31.2	31.2	32.2	32.2	41.2	42.4
Kearney Alfalfa Mills----------------	20	OP 1/	Kearney	64	72	68	65	78	101	31.2	31.2	32.2	32.2	41.2	42.4
Kimball Power Plant------------------	49	I	Kimball	169	184	194	198	0	0	28.9	28.8	28.7	40.1	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Kansas-Nebraska Natural Gas Co., Inc.--Con.															
Laurel Power Plant-------------------	49	I	Laurel	58	61	61	55	0	0	30.1	30.1	30.1	38.0	0	0
Leprino Cheese Mfg. Co.---------------	20	I	Chappell	0	65	76	86	0	0	0	30.0	29.9	37.5	0	0
Lexington Alfalfa Dehy., Inc.---------	20	OP 1/	Darr	121	131	128	121	116	138	31.2	31.2	32.1	32.2	41.2	42.3
Loup Valley Alfalfa Mills, Inc.-------	20	OP 1/	Burwell	0	51	53	0	0	53	0	31.2	32.1	0	0	42.4
Mid American Dairymen, Inc.-----------	20	I	Fullerton	66	70	86	83	0	0	30.0	30.0	29.8	37.7	0	0
Mobil Oil Co.-------------------------	13	I	Kimball	78	86	80	65	0	0	35.3	35.1	34.5	43.3	0	0
National Alfalfa Dehydrating and Milling Co.-------------------------	20	OP	Cozad and Others 3/	677	704	656	619	0	0	31.2	31.2	32.2	32.2	0	0
Nebraska Alfalfa Farms, Inc.----------	01	OP	Darr	191	215	197	0	0	0	31.2	31.2	32.2	0	0	0
Nebraska Farm Products, Inc.----------	20	OP 1/	Cozad	127	120	124	120	104	0	31.2	31.2	32.2	32.2	41.2	0
Nebraska Public Power District--------	49	I	Ogallala	417	502	614	631	0	0	27.8	27.7	27.6	35.7	0	0
Do----------------------------------	49	I	Scottsbluff	2,185	2,258	2,651	2,190	0	0	22.8	22.6	22.6	37.9	0	0
Nebraska Rendering Co.----------------	20	I	McCook	63	72	80	87	0	0	30.1	30.0	29.9	37.9	0	0
Nebraska State Boys Training School---	92	I	Kearney	0	0	0	54	53	50	0	0	0	38.3	39.3	43.1
Neu Cheese Co.------------------------	20	I	Hartington	0	0	72	72	0	0	0	0	30.0	37.6	0	0
Norfolk Rendering---------------------	20	I	Norfolk	0	0	0	0	0	63	0	0	0	0	0	43.2
Norfolk State Hospital----------------	80	I	--do--	116	110	99	97	93	87	29.3	29.4	29.6	37.6	38.5	42.4
Nu Pro Products-----------------------	NA	F	Lexington	0	0	0	0	70	0	0	0	0	0	41.2	0
Do----------------------------------	NA	F	Ord	0	0	0	0	118	0	0	0	0	0	41.2	0
Ogallala Power Plant------------------	49	I	Ogallala	0	0	0	0	676	683	0	0	0	0	36.6	40.8
Orchard Cheese Factory----------------	20	I	Orchard	53	0	0	0	0	0	30.2	0	0	0	0	0
Ord Power Plant-----------------------	49	I	Ord	118	128	136	147	0	0	29.6	29.4	29.3	37.0	0	0
Orleans Milling Co.-------------------	07	OP 1/	Orleans	51	53	0	0	51	60	31.2	31.2	0	0	41.2	42.4
Oxford Power Plant--------------------	49	I	Oxford	60	64	71	81	0	0	30.1	30.1	30.0	37.7	0	0
Pacific Fruit Express Co.-------------	20	I	North Platte	82	79	73	79	71	34	29.1	29.2	29.3	37.2	37.9	39.2
Pan American Petroleum Corp.----------	13	I	Banner and Kimball	278	275	301	0	0	0	33.2	33.2	34.6	0	0	0
Plainview Co-op Creamery--------------	20	I	Plainview	58	53	66	0	0	0	30.2	30.2	30.0	0	0	0
Plainview Power Plant-----------------	49	I	--do--	80	83	86	63	0	0	29.8	29.8	29.8	38.0	0	0
Platte Valley Products, Inc.----------	20	OP 1/	Darr and Lexington	321	357	332	360	311	339	31.2	31.2	32.1	32.2	41.0	42.4
Progress Livestock Feed Co.-----------	20	OP 1/	Overton	78	66	80	70	56	0	31.2	31.2	32.2	32.2	41.2	0
Progress Products Co., Inc.-----------	20	OP 1/	--do--	206	232	231	210	198	194	31.2	31.2	32.2	32.2	41.2	42.4
Randolph Power Plant------------------	49	I	Randolph	0	0	54	57	0	0	0	0	30.2	37.9	0	0
Ravenna Cheese Co.--------------------	20	I	Ravenna	0	0	0	60	0	0	0	0	0	38.2	0	0
Sargent Alfalfa Products--------------	20	OP 1/	Sargent	0	0	57	61	68	79	0	0	32.2	32.2	41.2	42.4
Sargent Power Plant-------------------	49	I	--do--	0	0	54	61	0	0	0	0	30.2	38.0	0	0
Shofstall, Inc.-----------------------	07	F	Odessa	0	0	0	0	239	280	0	0	0	0	41.2	42.4
Do----------------------------------	07	OP	--do--	188	315	275	258	0	0	31.2	31.2	32.2	32.2	0	0
Sidney Power Plant--------------------	49	I	Sidney	251	253	265	255	0	0	30.3	31.2	31.0	39.3	0	0
Solomon Mill Co., Inc.----------------	07	OP	Buda	84	0	0	0	0	0	31.2	0	0	0	0	0
Stanton Milling Co.-------------------	NA	F	Stanton	0	0	0	0	56	0	0	0	0	0	41.2	0
Sugar Creek Foods---------------------	20	I	O'Neill	0	65	73	74	0	0	0	30.0	29.9	37.7	0	0
Superior Oil Co.----------------------	13	I	Cheyenne County	65	51	50	60	68	70	30.0	30.3	30.3	41.5	41.9	45.9
Swift and Co.-------------------------	20	I	Scottsbluff	126	135	131	152	0	0	32.4	32.0	32.0	39.8	0	0
Trico Feed Mills----------------------	20	OP	Minden	95	128	143	114	0	0	31.2	31.2	32.2	32.2	0	0
Wilson Ranch--------------------------	NA	I	NA	86	0	0	0	0	0	29.8	0	0	0	0	0
Western Alfalfa Corp.-----------------	01	OP	Elm Creek, Odessa, Cozard, Riverdale and Lexington	727	809	718	672	0	0	31.2	31.2	32.2	32.2	0	0
Do----------------------------------	01	F	Elm Creek, Odessa, Cozad, Riverdale, Venango and Lexington	0	0	0	0	604	653	0	0	0	0	41.2	42.4
Winside Dehydrating Co.---------------	20	OP	Winside	0	66	54	74	0	0	0	31.2	32.2	32.2	0	0
Do----------------------------------	20	F	--do--	0	0	0	0	78	69	0	0	0	0	41.1	42.4

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Kansas-Nebraska Natural Gas Co., Inc.--Con.															
Sales less than 50,000 Mcf------------	NA	OP	NA	321	31	148	162	0	0	31.2	31.2	32.2	32.2	0	0
Do----------------------------------	NA	F	NA	0	0	0	0	227	184	0	0	0	0	41.1	42.4
Do----------------------------------	NA	I	NA	0	0	0	792	0	220	0	0	0	40.5	0	45.6
Do----------------------------------	NA	I	NA	592	987	888	0	0	0	33.8	32.0	33.2	0	0	0
Do----------------------------------	NA	I	NA	451	0	0	0	0	0	31.5	0	0	0	0	0
Do----------------------------------	NA	I	NA	0	0	0	0	283	0	0	0	0	0	41.6	0
Subtotal or average---------------	-	-	-	28,051	30,581	31,763	30,495	24,703	26,815	29.1	29.1	29.2	36.0	38.4	41.7
Natural Gas Pipeline Co. of America:															
Phillips Petroleum Co.----------------	29	F	Beatrice	8,409	8,081	7,925	7,713	7,828	8,705	29.8	29.4	32.1	36.1	40.3	45.6
Subtotal or average---------------	-	-	-	8,409	8,081	7,925	7,713	7,828	8,705	29.8	29.4	32.1	36.1	40.3	45.6
Northern Natural Gas Co.:															
Allied Chemical and Dye Corp.---------	28	F	La Platte	5,218	4,348	4,368	4,370	4,360	0	34.0	34.3	35.3	35.7	39.5	0
Do----------------------------------	28	I	--do--	1,106	2,075	2,646	2,559	2,372	0	27.5	27.4	28.1	32.8	36.0	0
Ash Grove Lime and Cement Co.---------	32	I	Louisville	2,786	2,249	2,005	2,115	2,134	2,246	27.0	29.0	29.0	33.7	36.4	43.0
Brown and Brown, Inc.-----------------	NA	F	Leshara	56	0	0	0	0	0	33.6	0	0	0	0	0
Do----------------------------------	NA	I	--do--	0	0	0	81	96	95	0	0	0	38.4	40.9	47.3
Cominco Products, Inc.----------------	NA	F	Beatrice	578	640	636	601	622	645	31.8	32.6	32.8	36.7	40.0	46.2
Endicott Clay Products Co.------------	32	I	Fairbury	155	159	164	146	0	0	31.5	33.5	35.0	36.7	0	0
Do----------------------------------	32	I	Endicott	0	0	0	0	154	200	0	0	0	0	41.2	48.1
Midwest Pipe Coating, Inc.------------	32	I	Valley	54	0	0	0	0	0	41.0	0	0	0	0	0
Morrison and Quirk--------------------	NA	I	Bancroft	87	93	103	104	133	133	30.7	33.0	32.7	38.2	40.0	46.7
National By-Products------------------	20	I	Ralston	95	125	141	154	0	0	40.4	35.5	38.5	43.6	0	0
Do----------------------------------	20	I	La Platte	0	0	0	0	112	79	0	0	0	0	46.1	52.9
Nebraska Public Power System----------	49	I	Bellevue	3,272	1,865	1,147	2,642	1,839	2,264	26.3	27.0	27.1	32.1	35.4	42.0
Schuyler Packing Co.------------------	20	I	Schuyler	0	102	150	147	193	226	0	32.6	32.7	38.8	41.4	49.2
Union Texas Petroleum-----------------	29	F	La Platte	0	0	0	0	0	4,375	0	0	0	0	0	47.5
Do----------------------------------	29	I	--do--	0	0	0	0	0	2,286	0	0	0	0	0	42.8
Valley Dehydrating Co.----------------	20	I	Valley	60	0	50	0	0	0	33.4	0	36.2	0	0	0
Valmont Industries, Inc.--------------	34	F	--do--	57	60	60	53	62	61	45.6	45.1	45.2	49.4	53.2	59.5
Do----------------------------------	34	I	--do--	0	0	0	0	82	116	0	0	0	0	41.8	57.8
Sales less than 50,000 Mcf------------	NA	I	NA	135	165	166	151	97	121	36.7	39.6	39.4	47.1	54.3	60.6
Do----------------------------------	NA	F	NA	77	155	134	0	0	148	64.6	58.5	62.4	0	0	78.9
Do----------------------------------	NA	F	NA	0	0	0	164	0	0	0	0	0	69.4	0	0
Do----------------------------------	NA	F	NA	0	0	0	0	152	0	0	0	0	0	73.3	0
Subtotal or average---------------	-	-	-	13,736	12,036	11,770	13,287	12,408	12,995	30.4	31.3	32.1	34.9	38.4	45.5
State total-----------------------	-	-	-	51,942	52,754	53,505	53,352	47,102	50,523	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Firm sales in 1972 and 1973.
2/ Gothenburg, Riverdale, Wood River, Shelton, Wausa (1972 and 1973 also includes: Darr; Loomis; Minden, Cambridge, Gibbon) (1973 also includes: Abbot, Lexington, Ord, Stanton).
3/ Darr Gothenburg, Lexington, Gibbon, Ord, Willow Island.

Table 4.--Main line sales to industrial users, by State, 1968-73

Nevada

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Southwest Gas Corp.: 2/															
Kerr-McGee Chemical Corp.-------------	28	F	Henderson	312	338	313	NA	NA	NA	44.3	46.7	50.1	NA	NA	NA
Anaconda Copper-----------------------	33	F	Weed Heights	77	95	60	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Basic, Inc.---------------------------	32	F	Gabbs	1,631	2,000	1,956	NA	NA	NA	55.0	55.0	55.0	NA	NA	NA
Blue Diamond--------------------------	14	F	Blue Diamond	329	406	0	NA	NA	NA	43.3	46.1	0	NA	NA	NA
Duval Corp.---------------------------	14	F	Copper Canyon	14	14	16	NA	NA	NA	67.5	67.3	67.0	NA	NA	NA
Eagle Picher No. 1 1/-----------------	10	F	Clark Station	188	190	389	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Eagle Picher No. 2 1/-----------------	10	F	Colado	161	214	0	NA	NA	NA	55.3	55.3	0	NA	NA	NA
Fort Mohave---------------------------	97	F	Fort Mohave	0	0	842	NA	NA	NA	0	0	45.7	NA	NA	NA
John Manville-------------------------	14	F	Henderson	371	374	407	NA	NA	NA	47.5	48.5	48.8	NA	NA	NA
Minimum Security Prison---------------	92	F	Carson City	24	29	31	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Nevada Cement Co.---------------------	32	F	Fernley	973	1,154	1,752	NA	NA	NA	40.7	40.9	43.4	NA	NA	NA
Nevada Indian Agency------------------	91	F	Stewart	67	65	62	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Nevada Power--------------------------	49	F	Las Vegas	7,038	8,677	11,882	NA	NA	NA	38.6	43.0	44.3	NA	NA	NA
Nevada State Prison-------------------	92	F	Carson City	36	34	36	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Pacific Eng. and Prod. Co.------------	28	F	Henderson	17	17	12	NA	NA	NA	49.5	50.3	51.3	NA	NA	NA
Sierra Talc and Chemical--------------	28	F	Fernley	12	16	20	NA	NA	NA	55.2	55.3	55.4	NA	NA	NA
Star City-----------------------------	NA	F	Winnemucca	0	38	0	NA	NA	NA	0	60.1	0	NA	NA	NA
State Stove Corp.---------------------	34	F	Henderson	0	5	106	NA	NA	NA	0	51.2	50.0	NA	NA	NA
Stauffer Chemical Co.-----------------	28	F	--do--	2,407	3,117	3,084	NA	NA	NA	42.2	42.3	42.6	NA	NA	NA
Titanium Metals Corp.-----------------	33	F	--do--	342	473	444	NA	NA	NA	47.4	47.6	48.5	NA	NA	NA
Tracy Power Plant---------------------	49	I	Clark Station	8,787	11,010	13,352	NA	NA	NA	38.0	39.0	40.0	NA	NA	NA
U.S. Lime Products--------------------	32	F	Apex	1,070	1,306	1,420	NA	NA	NA	43.3	46.1	46.1	NA	NA	NA
Do------------------------------------	32	F	Blue Diamond	0	0	352	NA	NA	NA	0	0	48.9	NA	NA	NA
Do------------------------------------	32	F	Henderson	623	627	612	NA	NA	NA	43.3	46.0	47.8	NA	NA	NA
Sales less than 50,000 Mcf------------	NA	F	Las Vegas	0	1	0	NA	NA	NA	0	101.4	0	NA	NA	NA
Subtotal or average-------------	-	-	-	24,479	30,200	37,148	NA	NA	NA	41.0	42.9	43.7	NA	NA	NA
State total---------------------	-	-	-	24,479	30,200	37,148	NA	NA	NA	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

1/ Data not reported separately in 1970.

2/ Form 2 was not available from Federal Power Commission for years 1971, 1972 and 1973.

Table 4.--Main line sales to industrial users, by State, 1968-1973

New Hampshire

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Granite State Gas Transmission, Inc:															
Pease Air Force Base----------------	97	F	Portsmouth	141	125	133	132	141	126	110.0	110.0	110.0	123.7	133.4	124.0
Do----------------------------------	97	I	--do--	162	258	257	310	327	411	40.0	40.0	40.0	47.6	59.5	60.4
Subtotal or average-------------	-	-	-	303	383	390	442	468	537	72.5	62.8	63.8	70.3	81.7	75.4
State total---------------------	-	-	-	303	383	390	442	468	537	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

New Jersey

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Manufacturers Light and Heat Co.:															
Arco Welding Products - Div.															
Acrods Plant-----------------------	36	F	Union	0	92	64	0	0	0	0	61.9	62.4	0	0	0
Subtotal or average-------------	-	-	-	0	92	64	0	0	0	0	61.9	62.4	0	0	0
State total---------------------	-	-	-	0	92	64	0	0	0	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

New Mexico

Company and customer	Customer SIC	Type of sale	Delivery point	Cas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
El Paso Natural Gas Co.:															
El Paso Electric Co.-----------------	49	F	Dona Ana County	6,034	8,002	6,665	6,019	9,981	9,151	26.2	28.4	32.1	36.3	38.2	41.6
Kennecott Copper Corp.---------------	33	F	Hurley	4,243	5,187	5,297	5,243	5,038	4,832	33.9	33.8	35.1	38.6	40.1	43.7
Phelps Dodge Corp.-------------------	33	F	Tyrone	79	918	1,529	1,721	2,069	2,234	29.2	32.9	35.0	38.8	40.2	44.0
Shell Oil Co.:															
Ciniza-------------------------------	29	F 1/	McKinley County	836	861	1,219	1,043	675	989	29.6	32.4	35.1	38.2	40.1	44.1
Wingate------------------------------	13	F 1/	--do--	2	2	2	3	3	3	29.6	32.5	35.2	38.8	40.2	44.1
Shell Pipe Line Corp.----------------	46	F 1/	San Juan County	34	36	40	38	41	31	29.6	32.3	35.1	38.8	40.2	43.2
Texaco, Inc.-------------------------	13	I	Lea County	30	95	75	40	9	0	22.4	23.2	25.0	27.0	28.3	0
Subtotal or average-------------	-	-	-	11,258	15,101	14,827	14,107	17,816	17,240	29.4	30.8	33.7	37.6	39.0	42.6
Transwestern Pipeline Co.:															
Climax Chemical Co.------------------	28	I	Lea County	407	430	483	494	475	466	20.1	20.1	21.2	23.6	25.9	30.2
Subtotal or average-------------	-	-	-	407	430	483	494	475	466	20.1	20.1	21.2	23.6	25.9	30.2
State total---------------------	-	-	-	11,665	15,531	15,310	14,601	18,291	17,706	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.
1/ Sales reported as interruptible in 1968.

Table 4.--Main line sales to industrial users, by State, 1968-73

North Carolina

Company and customer	Customer SIC	Type of sale	Delivery point	Cas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Transcontinental Cas Pipeline Corp.:															
Sales less than 50,000 Mcf-----------	NA	1/	NA	25	21	8	0	0	0	22.8	22.8	23.7	0	0	0
Subtotal or average--------------	-	-	-	25	21	8	0	0	0	22.8	22.8	23.7	0	0	0
State total----------------------	-	-	-	25	21	8	0	0	0	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Purge and test.

Table 4.--Main line sales to industrial users, by State, 1968-73

North Dakota

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Montana-Dakota Utilities Co.:															
American Oil Co.--------------------	29	I	Mandan	559	1,097	439	199	177	276	33.4	33.4	34.0	34.5	34.8	37.3
Sales less than 50,000 Mcf----------	NA	I	NA	78	0	0	0	0	0	40.3	0	0	0	0	0
Subtotal or average-------------	-	-	-	637	1,097	439	199	177	276	34.3	33.4	34.0	34.5	34.8	37.3
State total---------------------	-	-	-	637	1,097	439	199	177	276	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Ohio

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Gas Transport, Inc.:															
Anchor Hocking Glass Corp.-----------	32	OP	Gravel Bank	3,643	3,571	3,563	NA	NA	3,522	39.0	39.0	39.0	NA	NA	3.1
Subtotal or average--------------	-	-	-	3,643	3,571	3,563	NA	NA	3,522	39.0	39.0	39.0	NA	NA	53.1
Inland Gas Co.:															
Nitrogen Div. Allied Chemical Corp.--	28	F	South Point	8,474	8,524	9,595	9,290	7,508	6,554	39.7	39.7	39.7	47.2	48.8	49.5
Subtotal or average--------------	-	-	-	8,474	8,524	9,595	9,290	7,508	6,554	39.7	39.7	39.7	47.2	48.8	49.5
Panhandle Eastern Pipeline Co.:															
General Motors Corp.-----------------	37	I	Defiance	2,411	2,655	2,283	2,933	2,824	2,341	45.5	45.6	45.3	45.4	45.6	45.6
Johns-Manville Fiber Glass, Inc.-----	32	I	--do--	2,130	2,390	2,334	2,406	2,548	2,142	45.5	43.8	43.8	51.1	54.0	56.9
Toledo Edison Co.--------------------	49	I	Defiance County	208	149	269	255	203	146	44.8	44.8	45.1	46.3	47.2	49.9
Subtotal or average--------------	-	-	-	4,749	5,194	4,886	5,594	5,575	4,629	44.7	44.7	44.5	47.9	49.5	51.0
United Fuel Gas Co.:															
Detroit Steel Corp.------------------	33	I	New Boston	5,426	6,031	5,976	0	0	0	40.3	40.0	40.5	0	0	0
Subtotal or average--------------	-	-	-	5,426	6,031	5,976	0	0	0	40.3	40.0	40.5	0	0	0
State total----------------------	-	-	-	22,292	23,320	24,020	14,884	13,083	14,705	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Oklahoma

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Arkansas-Louisiana Gas Co.:															
Amoco Production Co.----------------	13	F	Kingfisher	0	0	0	0	243	245	0	0	0	0	17.8	18.6
Apco Oil Corp.----------------------	29	I 1/	Caddo	1,855	1,944	1,862	1,845	1,769	1,289	20.6	21.5	22.0	23.1	28.2	46.7
Blackwell Zinc Co.------------------	33	I 1/	Kay	4,722	4,595	4,376	4,601	4,521	2,775	21.2	21.3	21.3	25.6	26.8	38.3
Congoleum Industries----------------	39	I 1/	Latimer	0	0	93	206	268	310	0	0	26.9	32.0	34.6	41.6
OMR Pipeline Co.--------------------	46	I 1/	Pontotoc	78	79	85	62	0	0	23.7	24.6	24.3	37.9	0	0
Pan American Petro. Corp.-----------	29	I 1/	Kingfisher	398	341	322	267	0	0	15.7	17.0	17.4	17.7	0	0
Public Service Co. of Okla.---------	49	I	Comanche	81	64	0	0	0	0	23.5	24.0	0	0	0	0
Sequoyah Carpet Mills---------------	22	I 1/	Caddo	192	222	183	255	308	237	25.1	25.0	24.7	24.9	34.5	43.5
Shell Oil Co.-----------------------	13	I	Latimer	84	0	0	0	0	0	25.8	0	0	0	0	0
Sun Oil Co.-------------------------	29	I 1/	Stephens	2,819	2,455	2,314	1,981	1,836	2,129	21.2	22.1	24.1	26.5	31.8	41.5
Transok Pipe Line Co.---------------	46	F	Grady	0	0	0	202	0	0	0	0	0	21.8	0	0
United Clay Pipe Co.----------------	14	I 1/	Seminole	0	0	168	183	186	203	0	0	25.0	25.0	26.1	42.7
United States Gypsum Co.------------	32	I 1/	Blaine	487	472	434	497	524	519	27.8	29.1	30.7	30.9	33.7	42.8
Warren Petroleum Co.----------------	13	I 1/	Stpehens	275	211	177	178	84	0	23.1	23.1	23.2	24.6	25.0	0
Western Farmer Elec. Coop.----------	49	I 1/	Caddo	1,069	1,509	2,345	2,875	4,498	2,039	20.7	23.5	24.1	25.4	34.6	44.7
Wolfe Drilling Co.------------------	13	I	Latimer	84	0	0	0	0	0	25.9	0	0	0	0	0
Sales less than 50,000 Mcf----------	NA	I 1/	NA	76	62	86	40	27	32	27.8	39.1	33.7	27.3	48.6	55.7
Sales to Public Authorities:															
Oklahoma State Reformatory---------	92	I 1/	Greer	66	67	72	64	65	67	35.7	37.0	36.9	39.8	42.7	51.4
U.S. Clinton Sherman AFB-----------	97	I 1/	Roger Mills	325	318	128	51	107	84	29.4	30.2	32.3	39.4	37.2	46.2
U.S. Fort Sill Military Reserv.----	97	I 1/	Comanche	1,864	1,887	1,837	1,588	1,542	1,534	27.5	28.0	28.6	31.2	33.9	43.8
U.S. Naval Ammunition Depot--------	97	I 1/	Pittsburg	460	423	450	417	445	383	25.7	27.1	27.7	32.4	33.3	41.0
Sales less than 50,000 Mcf---------	NA	I 1/	NA	12	13	15	15	13	14	42.0	42.7	42.7	51.4	55.0	63.0
Subtotal or average-------------	-	-	-	14,947	14,662	14,947	15,327	16,436	11,860	22.5	23.3	23.9	26.4	31.4	41.9
Arkansas-Oklahoma Gas Corp.:															
Sales to Public Authorities:															
U.S. Army Engineers----------------	97	F	Wister	2	1	NA	NA	NA	0	34.6	34.7	NA	NA	NA	0
Subtotal or average-------------	-	-	-	2	1	NA	NA	NA	0	34.6	34.7	NA	NA	NA	0
Cities Service Gas Co.:															
Associated Companies:															
Cities Service Oil Co.-------------	29	I	Kay	1,647	1,711	749	1,076	828	746	20.0	20.1	19.3	21.8	28.2	34.7
Sales less than 50,000 Mcf---------	NA	I	NA	1	1	1	4	1	0	43.2	43.2	43.2	43.2	44.9	0
Do------------------------------	NA	I	NA	2	3	3	1	6	0	43.3	43.3	43.2	43.2	46.2	0
Do------------------------------	NA	F&I	NA	0	0	0	0	0	4	0	0	0	0	0	56.9
Other Companies:															
Atlantic Richfield Corp.-----------	13	I	Creek	0	0	53	0	0	0	0	0	26.7	0	0	0
Bareco Div., Petrolite Corp.-------	29	I	Osage	1,211	1,433	1,554	1,497	1,534	1,437	24.3	24.7	25.2	25.6	29.1	32.6
Continental Oil Co.----------------	29	I	Kay	0	0	698	1,927	2,210	1,300	0	0	22.8	23.1	24.4	30.7
Evans & Throop Const. Co.----------	16	I	Osage	0	0	0	57	0	0	0	0	0	34.9	0	0
Kerr-McGee Corp.-------------------	29	I	Pawnee	429	446	505	458	236	0	25.2	25.6	26.0	26.4	32.0	0
Do------------------------------	29	I	Payne	856	998	1,105	1,102	0	0	24.5	24.9	25.4	25.7	0	0
National Zinc Co., Inc.------------	33	I	Osage	1,302	1,468	1,416	1,401	1,256	1,214	23.3	23.5	24.4	27.4	29.7	34.1
Phillips Petroleum Co.-------------	29	I	--do--	1,742	1,692	1,804	1,762	1,669	2,176	27.7	28.7	28.8	31.6	31.6	32.5
Sequoia Refining Corp.-------------	29	I	Kay	2,376	2,061	1,799	0	0	0	22.1	22.5	22.4	0	0	0
Sunray DX Oil Co.------------------	29	I	--do--	56	52	52	51	0	0	27.7	27.9	27.9	27.9	0	0
Williams Brothers Pipe Line Co.----	46	I	Osage	120	127	137	132	142	207	25.3	25.8	28.8	28.9	34.4	35.6
Sales less than 50,000 Mcf---------	NA	I	NA	0	0	0	10	0	248	0	0	0	43.6	0	49.5
Do------------------------------	NA	F&I	NA	0	0	0	33	0	199	0	0	0	28.3	0	49.6
Do------------------------------	NA	I	NA	0	33	20	0	0	0	0	32.7	39.8	0	0	0
Do------------------------------	NA	I	NA	60	0	0	0	0	0	35.7	0	0	0	0	0
Do------------------------------	NA	I	NA	73	0	0	0	0	0	32.9	0	0	0	0	0
Do------------------------------	NA	F&I	NA	91	0	0	0	0	0	36.7	0	0	0	0	0
Do------------------------------	NA	I	NA	0	150	0	0	0	0	0	31.9	0	0	0	0
Do------------------------------	NA	F&I	NA	0	0	87	0	0	0	0	0	37.3	0	0	0
Do------------------------------	NA	I	NA	0	0	99	0	0	0	0	0	32.7	0	0	0
Do------------------------------	NA	F&I	NA	0	96	0	0	0	0	0	36.7	0	0	0	0
Do------------------------------	NA	F&I	NA	140	0	0	0	0	0	32.9	0	0	0	0	0
Do------------------------------	NA	F&I	NA	0	127	0	0	0	0	0	33.9	0	0	0	0
Do------------------------------	NA	F&I	NA	0	0	120	0	0	0	0	0	35.0	0	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Oklahoma

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Cities Service Gas Co.--Continued															
Other Companies:															
Sales less than 50,000 Mcf---------	NA	I	NA	0	0	0	269	0	0	0	0	0	31.2	0	0
Do--------------------------------	NA	F&I	NA	0	0	0	255	0	0	0	0	0	36.5	0	0
Do--------------------------------	NA	F&I	NA	0	0	0	0	265	0	0	0	0	0	40.8	0
Do--------------------------------	NA	I	NA	0	0	0	0	227	0	0	0	0	0	34.5	0
Sales to Public Authorities:															
Sales less than 50,000 Mcf---------	NA	F	NA	0	0	0	0	3	12	0	0	0	0	25.2	48.9
Do--------------------------------	NA	F&I	NA	2	0	0	3	0	0	46.8	0	0	46.5	0	0
Do--------------------------------	NA	F&I	NA	0	3	3	0	0	0	0	45.6	46.3	0	0	0
Do--------------------------------	NA	F&I	NA	0	0	0	9	0	0	0	0	0	37.8	0	0
Do--------------------------------	NA	F&I	NA	0	9	10	0	9	0	0	37.8	38.1	0	48.1	0
Do--------------------------------	NA	F&I	NA	11	0	0	0	0	0	38.8	0	0	0	0	0
Subtotal or average-------------	-	-	-	10,119	10,460	10,215	10,047	8,386	7,543	24.0	24.5	25.1	26.7	29.1	33.8
Colorado Interstate Corp.:															
Public Service Co. of Oklahoma-------	49	I	Caddo	2,274	1,807	0	0	0	0	18.1	18.1	0	0	0	0
Subtotal or average-------------	-	-	-	2,274	1,807	0	0	0	0	18.1	18.1	0	0	0	0
Lone Star Gas Co.:															
Broce Const. Co. of Okla., Inc.------	16	I	Carter	0	0	58	0	0	0	0	0	28.8	0	0	0
Dierks Forest, Inc.-Broken Bow-------	26	I	McCurtain	1,119	0	0	0	0	0	24.5	0	0	0	0	0
Dierks Forest, Inc.-Hot Springs------	26	I	--do--	198	0	0	0	0	0	26.3	0	0	0	0	0
Hugo Milling Co.---------------------	NA	I	Choctaw	0	0	0	0	0	54	0	0	0	0	0	33.2
Guy H. James Const. Co.--------------	16	I	Garvin	0	0	50	0	0	0	0	0	28.7	0	0	0
Kerr McGee Corp.---------------------	29	I	--do--	0	0	0	0	0	2,025	0	0	0	0	0	31.3
Kerr McGee Oil Industries------------	29	I	--do--	1,498	1,631	2,691	2,995	3,269	1,761	25.4	25.9	26.4	26.8	28.1	38.0
OMR Pipe Line Co.--------------------	46	I	--do--	0	67	0	0	0	0	0	29.3	0	0	0	0
Pauls Valley State Hospital----------	80	I	--do--	78	86	90	89	83	78	28.7	28.9	29.7	29.7	31.4	33.8
Pennsylvania Glass Co.---------------	32	I	Johnson	0	0	0	160	187	205	0	0	0	28.9	30.2	34.1
Potters Industries Inc.--------------	32	I	Bryan	0	0	0	63	0	0	0	0	0	29.3	0	0
Republic Gypsum Co.------------------	32	I	Jackson	447	494	375	456	530	502	26.3	26.4	27.6	27.8	30.0	34.5
Sequoyah Industries Co.--------------	22	I	Murray	0	74	197	223	243	187	0	28.2	28.4	28.5	30.0	34.3
Sohio Petroleum Co.------------------	13	I	Garvin	0	0	0	102	0	0	0	0	0	25.9	0	0
Sonner Const. Co.--------------------	16	I	McClain	0	0	70	0	0	0	0	0	29.5	0	0	0
Weyerhauser Co. (Broken Bow)---------	24	I	McCurtain	0	1,224	1,100	1,403	1,610	1,944	0	25.1	25.9	26.3	27.6	29.9
Weyerhauser Co. (Hot Springs)--------	24	I	--do--	0	213	454	435	967	1,186	0	26.8	26.8	27.4	28.0	30.1
Sales less than 50,000 Mcf-----------	NA	I	NA	150	132	236	134	285	182	34.6	34.0	34.3	37.2	39.2	51.5
Subtotal or average-------------	-	-	-	3,490	3,921	5,321	6,060	7,174	8,124	25.8	26.2	27.0	27.2	28.7	33.1
Union Gas System, Inc. 2/ :															
Smelter Gas - 3 accounts-------------	33	F	Osage	98	0	0	0	0	0	14.1	0	0	0	0	0
Sales less than 50,000 Mcf-----------	NA	F	NA	14	0	0	0	0	0	53.2	0	0	0	0	0
Subtotal or average-------------	-	-	-	112	0	0	0	0	0	19.0	0	0	0	0	0
State total---------------------	-	-	-	30,944	30,851	30,483	31,434	31,996	27,527	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Firm sales in 1971, 1972 and 1973.
2/ The Federal Power Commission has granted Union Gas Systems, Inc. limited relief from its reporting obligations and thus the company did not file a report for the years 1969, 1970, 1971, 1972 and 1973.

Table 4.--Main line sales to industrial users, by State, 1968-73

Oregon

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
El Paso Natural Gas Co.:															
Oregon Portland Cement Co.-----------	32	I	Lime	709	98	0	0	0	0	38.0	37.9	0	0	0	0
Do-----------------------------------	32	F	--do--	201	0	0	0	0	0	42.2	0	0	0	0	0
Subtotal or average-------------	-	-	-	910	98	0	0	0	0	38.9	37.9	0	0	0	0
State total---------------------	-	-	-	910	98	0	0	0	0	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Pennsylvania

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Carnegie Natural Gas Co.:															
U.S. Steel Corp.	34	F	Allegheny Co.	12,702	16,222	21,170	NA	NA	7,976	42.4	43.7	46.1	NA	NA	61.4
Do	34	I	--do--	8,016	7,239	3,813	NA	NA	851	46.9	47.6	48.1	NA	NA	54.8
Subtotal or average	-	-	-	20,718	23,461	24,983	NA	NA	8,827	44.1	44.9	46.4	NA	NA	60.7
State total	-	-	-	20,718	23,461	24,983	NA	NA	8,827	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

South Carolina

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Southern Natural Gas Co.:															
Dixie Clay Co.	14	I	Bath	95	89	78	80	71	74	36.8	37.0	40.3	50.4	51.8	51.5
Graniteville Co.	22	F	Graniteville	82	462	497	516	522	551	39.6	39.8	45.4	49.8	53.6	53.2
Do	22	I	--do--	1,071	678	723	1,226	1,104	968	31.3	31.5	34.1	48.7	53.7	53.6
Do	22	I	Warrenville	0	0	0	53	130	99	0	0	0	50.6	53.7	53.6
J. M. Huber Corp.	14	I	Langley	179	159	101	109	92	102	36.8	37.0	39.2	49.5	51.6	51.5
Do	14	I	Graniteville	106	97	65	0	0	57	36.8	37.0	38.7	0	0	51.5
National Kaolin Products Co.	14	I	Aiken	63	64	55	59	54	0	36.8	37.0	39.3	50.5	51.6	0
S. C. Electric & Gas Co.	49	I	Beech Island	2,336	0	0	0	0	0	25.8	0	0	0	0	0
Southeastern Clay Co.	14	I	Aiken	58	51	0	52	0	52	36.8	37.0	0	50.8	0	51.6
United Sierra Division, Cyprus Mines Corp.	14	I	--do--	60	73	61	53	0	55	36.8	37.0	42.9	49.3	0	51.5
United Merchants and Manufacturers, Inc.	22	I	Bath	54	0	0	0	0	0	31.3	0	0	0	0	0
Do	22	I	Clearwater	608	527	523	450	248	351	31.3	31.5	34.1	42.8	43.4	43.2
United Merchants and Manufacturers, Inc., Production Equipment	22	F	--do--	71	83	77	96	113	117	57.4	57.6	57.4	61.6	61.9	61.7
Do	22	I	--do--	0	0	0	1	2	3	0	0	0	137.1	143.1	192.4
Sales less than 50,000 Mcf	NA	I	NA	22	66	116	93	183	88	31.3	31.5	37.0	48.7	51.6	51.5
Subtotal or average	-	-	-	4,805	2,349	2,296	2,788	2,519	2,517	29.8	35.3	38.4	48.4	52.8	52.2
Transcontinental Gas Pipeline Corp.:															
Duke Power Co.	49	I	Williamson	7	0	0	0	0	0	27.7	0	0	0	0	0
Laurens Glass Works, Inc.	32	I	Laurens	14	0	0	0	0	0	35.3	0	0	0	0	0
Owens-Corning Fiberglass Corp.	32	I	Anderson	1	35	0	0	0	0	35.0	35.2	0	0	0	0
Do	32	F	--do--	3,176	3,541	2,891	2,995	3,254	3,164	42.6	41.4	44.8	47.7	50.6	54.3
Sales less than 50,000 Mcf 1/	NA	NS	NA	9	6	2	2	0	0	23.2	22.7	23.8	27.1	0	0
Subtotal or average	-	-	-	3,207	3,582	2,893	2,997	3,254	3,164	42.5	41.3	44.7	47.7	50.6	54.3
State total	-	-	-	8,012	5,931	5,189	5,785	5,773	5,681	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
NS Not specified.
1/ Purge and test.

Table 4.--Main line sales to industrial users, by State, 1968-73

South Dakota

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Montana-Dakota Utilities Co.:															
American Colloid Co.	32	I	Belle Fourche	271	333	331	342	365	422	35.2	35.2	36.0	36.3	36.6	38.3
Dakota Block	NA	I	Rapid City	0	0	0	116	170	173	0	0	0	39.0	36.9	38.9
Pete Lien and Sons, Inc.	32	I	--do--	261	333	399	400	436	560	35.5	35.4	36.4	36.5	36.9	38.7
Light Aggregates, Inc.	32	I	--do--	98	115	107	0	0	0	35.4	35.4	36.1	0	0	0
S.D. State Cement Plant	32	I	--do--	1,815	1,580	1,519	1,924	2,894	3,405	32.4	32.1	34.2	33.3	33.1	33.1
Sales less than 50,000 Mcf	NA	I	NA	54	0	0	0	0	0	46.7	0	0	0	0	0
Subtotal or average	-	-	-	2,499	2,361	2,356	2,782	3,865	4,560	33.5	33.2	34.9	34.4	34.0	34.5
Northern Natural Gas Co.:															
Sales less than 50,000 Mcf	NA	F	NA	2	7	7	8	5	6	81.1	73.0	76.8	85.4	90.2	95.4
Subtotal or average	-	-	-	2	7	7	8	5	6	81.1	73.0	76.8	85.4	90.2	95.4
State total	-	-	-	2,501	2,368	2,363	2,790	3,870	4,566	NAp	NAp	NAp	NAp	NAp	NAp

Table 4.--Main line sales to industrial users, by State, 1968-73

Tennessee

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Alabama-Tennessee Natural Gas Co.:															
Tennessee River Pulp and Paper Co.--	26	I	Counce	1,661	1,493	1,947	1,708	1,496	1,704	25.8	25.9	25.7	32.2	32.9	33.2
Subtotal or average-------------	-	-	-	1,661	1,493	1,947	1,708	1,496	1,704	25.8	25.9	25.7	32.2	32.9	33.2
East Tennessee Natural Gas Co.:															
Aluminum Co. of America-------------	33	F	Alcoa	5,242	5,588	5,331	5,144	5,429	5,912	40.7	41.6	41.6	51.4	53.4	50.9
Do----------------------------------	33	NS	--do--	288	51	33	8	4	67	26.0	25.9	25.7	32.9	34.7	33.2
ASG Industries, Inc.:															
Blue Ridge Glass Plant------------	32	F	Kingsport	754	821	848	786	0	0	43.4	42.3	41.6	48.9	0	0
Do------------------------------	32	I	--do--	2	9	40	44	0	0	38.2	38.1	38.3	47.5	0	0
Greenland Plate Glass Plant-------	32	F	--do--	1,317	1,302	1,234	1,137	0	0	43.1	43.6	43.7	50.7	0	0
Do------------------------------	32	I	--do--	0	2	21	26	0	0	0	38.1	42.9	45.7	0	0
ASG Industries, Inc.----------------	32	F	--do--	0	0	0	216	2,441	2,525	0	0	0	50.4	51.6	50.2
Do----------------------------------	32	I	--do--	0	0	0	2	21	68	0	0	0	101.7	55.9	55.3
Atomic Energy Commission------------	96	F	Oak Ridge	1,806	1,844	2,108	2,059	2,063	2,011	34.6	34.4	39.3	47.9	50.1	49.6
Do----------------------------------	96	OP	--do--	47	49	6	0	0	0	25.6	25.5	26.6	0	0	0
Do----------------------------------	96	NS	--do--	0	0	412	597	637	500	0	0	25.7	32.8	33.7	33.2
Bowaters Southern Paper Corp.-------	26	I	Calhoun	4,180	3,925	4,705	4,912	4,825	4,753	26.7	25.8	26.1	33.3	36.1	35.0
Do----------------------------------	26	F	--do--	1,186	1,206	1,206	1,176	1,217	1,219	42.0	41.7	41.5	49.2	51.1	50.1
General Shale Products Corp.--------	32	I	Kingsport	780	760	653	553	740	692	36.4	36.3	36.4	53.6	38.9	45.0
Greenback Industries----------------	33	F	Greenback	108	106	76	100	124	143	47.7	46.9	52.7	55.8	55.6	52.7
Hooker Chemical Corp.---------------	28	F	Columbia	53	52	52	52	51	52	41.4	41.7	41.7	49.2	51.3	50.5
Do----------------------------------	28	I	--do--	156	235	199	298	577	699	33.7	33.8	36.9	41.9	43.1	43.1
Mead Corp.--------------------------	26	F	Kingsport	69	69	69	69	68	69	41.9	41.6	41.5	48.9	51.3	50.3
Do----------------------------------	26	I	--do--	281	273	256	238	221	203	37.6	37.4	40.8	45.2	47.3	46.0
Mobil Chemical Co.------------------	28	F	Mt. Pleasant	603	584	603	213	102	75	41.6	42.1	41.7	64.4	51.4	55.2
Do----------------------------------	28	I	--do--	342	254	458	7	105	41	32.3	32.6	41.3	43.1	42.7	42.6
Monsanto Chemical Corp.-------------	28	I	Columbia	183	744	278	58	11	8	32.8	32.1	33.0	40.6	43.1	42.5
Do----------------------------------	28	F	--do--	447	455	436	389	362	390	41.7	41.5	42.0	50.9	54.2	52.4
Old Hickory Brick Co.---------------	32	I	Greenback	38	29	28	27	40	39	44.2	44.9	47.6	58.5	59.5	49.6
Olin-Mathieson Chemical Corp.-------	28	I	Calhoun	127	76	53	0	0	0	37.0	37.6	38.0	0	0	0
Olin Corp.--------------------------	28	I	--do--	0	0	0	69	14	80	0	0	0	45.2	53.3	45.8
Sewanee Silica Co.------------------	28	F	Sand Switch	53	63	55	48	53	52	55.2	52.4	56.6	66.5	67.0	68.3
Stauffer Chemical Co.---------------	28	F	Lowland	23	0	0	0	0	0	50.0	0	0	0	0	0
Do----------------------------------	28	I	--do--	1	0	0	0	0	0	38.3	0	0	0	0	0
Do----------------------------------	28	F	Mt. Pleasant	335	245	245	357	247	246	41.4	41.5	41.5	49.2	50.8	50.3
Do----------------------------------	28	I	--do--	747	840	948	853	1,068	1,024	33.7	33.7	34.4	41.3	42.8	42.2
Tennessee Eastman Co.---------------	28	F	Kingsport	3,633	3,852	4,018	5,480	6,717	6,807	41.2	41.8	42.0	47.4	50.1	49.0
Do----------------------------------	28	I	--do--	15	43	95	0	82	35	37.2	37.0	36.7	0	33.8	33.2
Union Carbide Corp.-----------------	28	I	Mt. Pleasant	1,599	1,709	1,833	1,722	1,506	1,612	32.8	32.8	32.7	40.9	42.4	41.7
Sales to Public Authorities:															
Tennessee Air National Guard------	97	F	Maryville	56	66	65	64	63	62	59.8	56.6	62.6	67.1	68.8	70.4
Subtotal or average-------------	-	-	-	24,471	25,252	26,364	26,704	28,788	29,384	37.0	37.3	37.5	43.6	46.0	46.2
Tennessee Natural Gas Lines, Inc.:															
E. I. du Pont de Nemours and Co.----	28	F	Old Hickory	171	160	139	0	0	0	68.9	62.2	59.5	0	0	0
Do----------------------------------	28	I	--do--	1,432	3,558	5,226	0	0	0	30.5	25.8	28.1	0	0	0
Do----------------------------------	28	F	Nashville	0	0	0	168	161	200	0	0	0	64.8	73.0	75.6
Do----------------------------------	28	I	--do--	0	0	0	4,904	6,236	5,939	0	0	0	38.5	37.2	36.5
Ford Motor Co.----------------------	37	I	--do--	1,167	983	1,043	1,166	1,315	1,410	29.3	29.3	29.3	35.5	36.6	36.1
Do----------------------------------	37	F	--do--	4,318	4,363	3,880	4,884	4,826	5,092	42.2	41.6	43.4	49.0	50.0	48.8
Gates Rubber Co.--------------------	30	F	Madison Plant	0	0.3	15	0	0	0	0	83.9	71.6	0	0	0
Do----------------------------------	30	I	--do--	219	276	226	0	0	0	29.7	29.8	35.1	0	0	0
Do----------------------------------	30	F	Nashville	0	0	0	17	32	0	0	0	0	80.1	84.2	0
Do----------------------------------	30	I	--do--	0	0	0	246	253	0	0	0	0	35.9	37.2	0
Armstrong Rubber Co.----------------	30	F	--do--	0	0	0	0	0	27	0	0	0	0	0	82.5
Do----------------------------------	30	I	--do--	0	0	0	0	0	263	0	0	0	0	0	36.6
Subtotal or average-------------	-	-	-	7,307	9,340	10,529	11,385	12,823	12,931	38.1	34.3	34.5	43.1	42.5	42.0
Trunkline Gas Co.:															
Sales less than 50,000 Mcf----------	NA	F	NA	15	21	23	29	NA	40	61.1	61.1	61.1	61.1	NA	61.1
Subtotal or average-------------	-	-	-	15	21	23	29	NA	40	61.1	61.1	61.1	61.1	NA	61.1
State total---------------------	-	-	-	33,454	36,106	38,863	39,826	43,107	44,059	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Cas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Arkansas Louisiana Cas Co.:															
American Petrofina Co.	29	I	Titus	2,107	2,169	2,303	0	0	0	23.9	25.9	26.2	0	0	0
Do	29	F	--do--	0	0	0	2,131	2,038	1,777	0	0	0	26.7	27.9	29.4
Arkla Chem. Corp. (Assoc. Co.)	32	I	N. Lansing Plt.-Harrison	108	116	98	0	0	0	13.2	13.6	12.6	0	0	0
Do	32	F	--do--	0	0	0	142	0	0	0	0	0	13.4	0	0
Champlin Petroleum Co.	13	F	Panola	0	0	0	0	52	0	0	0	0	0	14.8	0
Daingerfield Manufacturing Co.	NA	F	Morris	0	0	0	0	138	167	0	0	0	0	37.8	37.7
Federal Correctional Institute	92	I	Bowie	62	51	0	0	0	0	28.5	28.6	0	0	0	0
Do	92	F	--do--	0	0	0	57	60	35	0	0	0	28.5	33.4	38.0
LVO Corp. 1/	13	I	Cass	0	0	61	0	0	0	0	0	24.5	0	0	0
Do 1/	13	F	--do--	0	0	0	62	98	74	0	0	0	32.8	37.9	38.0
Tiger Manufacturing Co.	35	I	Morris	88	100	0	0	0	0	24.9	28.2	0	0	0	0
Sales less than 50,000 Mcf	NA	I	NA	100	55	161	0	0	0	25.6	26.5	31.4	0	0	0
Do	NA	F	NA	0	0	0	125	78	81	0	0	0	35.3	37.8	38.8
Sales to Public Authorities:															
U.S. Red River Arsenal	97	I	Bowie	1,633	1,556	1,567	0	0	0	28.2	29.1	29.9	0	0	0
Do	97	F	--do--	0	0	0	1,366	1,221	953	0	0	0	31.3	31.8	32.7
Federal Correctional Institute	92	F	--do--	0	0	0	0	0	22	0	0	0	0	0	38.1
Subtotal or average	-	-	-	4,098	4,047	4,190	3,883	3,685	3,109	25.5	26.9	27.4	28.2	30.0	31.5
Cities Service Cas Co.:															
Helmench and Payne Drlg. Co.	13	I	Hemphill	0	0	0	67	0	0	0	0	0	29.5	0	0
Loffland Brothers Co.	13	I	NA	0	0	0	0	55	0	0	0	0	0	29.5	0
Parker Drilling Co.	13	I	Hemphill	0	0	0	0	0	52	0	0	0	0	0	47.1
Sharp Drilling Co.	13	I	--do--	0	0	0	69	0	0	0	0	0	29.4	0	0
Sales less than 50,000 Mcf	NA	I	NA	20	25	0	7	0	53	29.9	29.4	0	37.5	0	47.6
Do	NA	I	NA	0	0	79	131	0	109	0	0	30.0	29.8	0	44.5
Do	NA	I	NA	15	17	22	0	0	0	38.1	36.9	37.3	0	0	0
Do	NA	I	NA	24	27	0	0	0	0	38.2	37.1	0	0	0	0
Do	NA	I	NA	0	0	48	0	0	0	0	0	35.5	0	0	0
Do	NA	I	NA	0	0	0	67	203	0	0	0	0	34.9	29.7	0
Do	NA	I	NA	0	0	0	0	64	0	0	0	0	0	37.8	0
Sales to Public Authorities:															
Sales less than 50,000 Mcf	NA	F	NA	1	1	1	0.3	0.4	0	46.2	46.0	46.6	48.1	63.1	0
Subtotal or average	-	-	-	60	70	150	341	322	214	35.4	34.4	32.9	30.8	31.3	45.9
El Paso Natural Gas Co.:															
American Smelting and Refining Co.	29	F	El Paso	2,324	2,697	2,664	2,423	2,628	2,949	27.6	30.3	33.0	36.6	38.2	41.9
El Paso Electric Co.	49	F	Newman Power Plt.-El Paso	16,033	16,752	14,025	8,054	20	22	26.2	28.5	32.3	35.2	38.3	40.2
Phelps Dodge Copper Products Corp.	33	F	El Paso	0	88	189	176	0.4	0	0	30.7	33.1	36.5	38.3	0
Phelps Dodge Refining Corp.	33	F	--do--	1,578	1,880	2,078	1,271	5	0	27.3	30.1	33.1	35.9	38.3	0
Southwestern Portland Cement Co.	32	F	--do--	1,378	1,083	900	948	1,155	1,258	27.7	30.2	33.2	36.8	38.2	42.0
Standard Oil Co. of Texas, A Div. of Chevron Oil Co.	29	I	--do--	3,289	3,352	3,277	0	0	0	27.4	27.5	32.3	0	0	0
Do	29	F	--do--	0	0	0	3,700	1,897	1,988	0	0	0	36.7	38.1	41.9
Texaco, Inc.	29	I	--do--	1,778	1,852	1,859	0	0	0	27.4	27.5	32.0	0	0	0
Do	29	F	--do--	0	0	0	1,399	0	0	0	0	0	36.3	0	0
Subtotal or average	-	-	-	26,380	27,704	24,992	17,971	5,705	6,217	26.7	28.7	32.4	35.9	38.1	41.9
Florida Gas Transmission Co.:															
Union Carbide Corp.	28	F	Seadrift Plt.-Calhoun	251	145	256	225	16	0	23.1	23.1	23.1	23.1	23.1	0
Do	28	F	Texas City Plt.-Chambers	35	0	0	0	0	0	23.1	0	0	0	0	0
Subtotal or average	-	-	-	286	145	256	225	16	0	23.1	23.1	23.1	23.1	23.1	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Lone Star Gas Co.:															
Acme Brick Co.----------------------	32	I	Ellis	191	173	0	0	0	0	25.5	25.8	0	0	0	0
Do----------------------------------	32	I	Parker	494	512	476	111	0	0	22.8	23.1	24.3	25.2	0	0
Aluminum Co. of America-------------	33	I	Milam	1,191	1,282	1,471	1,453	1,387	1,449	23.8	23.5	23.2	23.1	27.1	32.4
Anderson Refining Corp.-------------	29	I	Anderson	87	93	0	0	0	0	27.1	26.9	0	0	0	0
A. P. Green Fire Brick Co.----------	32	I	Hopkins	164	123	102	111	157	144	25.7	26.1	26.6	26.6	31.0	33.5
Armstrong Cork Co.------------------	32	I	Ellis	386	107	0	0	0	0	24.9	24.9	0	0	0	0
Atchison Topeka-Santa Fe Railroad Co.----------------------	40	I	Burleson	0	260	234	254	288	279	0	26.3	25.9	26.0	29.5	32.5
Athens Brick Co.--------------------	32	I	Comanche	156	159	152	151	149	145	26.2	26.3	26.5	26.6	31.1	37.4
Austin Bridge Co.-------------------	16	I	Dallas	0	0	0	0	0	64	0	0	0	0	0	35.6
Austin White Lime Co.---------------	32	I	Travis	1,371	1,569	1,489	1,337	1,507	1,682	23.6	23.4	23.2	23.1	26.6	32.5
Bandas Industries, Inc.-------------	NA	I	Bell	0	0	0	0	0	59	0	0	0	0	0	36.8
Bi Co. Pavers, Inc.-----------------	35	I	Grayson	55	68	80	0	79	55	27.7	28.6	31.5	0	32.1	40.1
Brazos Electric Power Cooperative---	49	I	Bell	364	213	290	0	859	1,651	24.5	25.7	26.0	0	27.5	32.4
Campbell Soup Co.-------------------	20	I	Lamar	1,095	1,183	1,108	1,210	1,208	1,231	23.8	23.9	24.4	24.3	28.5	30.5
Capital Silica Co.------------------	28	I	Johnson	0	0	0	0	0	50	0	0	0	0	0	42.8
Do----------------------------------	28	I	Somervell	0	52	0	0	0	0	0	25.1	0	0	0	0
Celotex Corp.-----------------------	24	I	Fisher	449	395	385	436	537	432	27.8	27.9	27.9	26.2	29.4	35.9
Charter International Oil Co.-------	13	F	Harris	0	0	0	0	544	0	0	0	0	0	23.0	0
Chemical Exchange Co.---------------	28	F	--do--	0	0	0	0	64	0	0	0	0	0	24.1	0
Chemical Lime Co.-------------------	32	I	Bosque	0	0	0	266	645	776	0	0	0	27.9	28.3	34.5
City of Garland - Lake Lavon Plant--	49	I	Dallas	2,600	2,838	0	0	0	0	21.9	22.6	0	0	0	0
Do----------------------------------	49	I	Collin	0	0	3,771	4,387	7,096	6,437	0	0	22.7	23.0	24.5	26.9
Clay-Burn Mfg. Co.------------------	32	I	Anderson	0	0	0	56	77	67	0	0	0	32.3	33.3	44.8
Col Tex Refining Co.----------------	29	I	Mitchell	1,279	153	153	0	0	0	24.2	23.6	23.6	0	0	0
Delhi Gas Pipeline Corp.------------	46	I	Navarro	0	0	0	0	56	0	0	0	0	0	37.3	0
Dresser Minerals--------------------	14	I	Limestone	376	435	509	527	529	636	25.4	25.3	24.4	24.7	28.5	33.8
Eaglelite Aggregate Co., Inc.-------	35	I	McLennan	0	115	180	280	158	196	0	25.9	25.7	24.6	28.6	30.4
E Systems, Inc.---------------------	NA	I	Hunt	0	0	0	0	0	65	0	0	0	0	0	43.7
Flex-O-Lite, Inc.-------------------	32	I	Lamar	333	352	153	0	0	0	26.8	26.9	27.2	0	0	0
Fort Hood - Post Engineers----------	97	F	Bell	2,191	1,781	1,905	0	0	1,818	30.8	31.4	26.7	0	0	37.1
Fred Bandas and Sons----------------	NA	I	--do--	0	69	56	0	0	0	0	27.4	29.9	0	0	0
General Electric Co.----------------	36	I	Smith	109	107	109	113	146	139	26.6	28.3	30.0	32.2	34.1	43.5
Georgia Pacific Corp.---------------	24	I	Hardeman	0	0	0	0	0	1,238	0	0	0	0	0	35.3
Do----------------------------------	24	I	Kerr	718	903	959	1,091	1,144	0	25.9	27.5	25.6	25.2	29.7	0
Gifford Hill Portland Cement Co.----	32	I	Ellis	1,942	1,958	2,587	3,562	3,773	4,908	24.1	24.0	23.6	23.4	29.8	29.4
Glass Containers Corp.--------------	32	I	Anderson	178	740	747	748	532	577	24.8	24.6	24.6	24.6	29.0	31.0
Houston Brick and Tile Co.----------	32	F	Harris	0	0	0	0	67	0	0	0	0	0	23.8	0
Ideal Cement Co.--------------------	32	F	--do--	0	0	0	0	1,782	0	0	0	0	0	21.3	0
T. L. James Co., Inc.---------------	13	I	Leon	97	0	0	0	0	0	24.4	0	0	0	0	0
Johns Manville Products Corp.-------	32	I	Grayson	239	244	238	275	282	286	27.0	27.4	27.7	27.3	34.8	36.4
Kerr Glass Mfg. Corp.---------------	32	I	Ellis	0	300	406	367	96	0	0	25.0	24.7	24.5	30.7	0
Knox Glass, Inc.--------------------	32	I	Anderson	542	0	0	0	0	0	24.7	0	0	0	0	0
Lone Star Industries----------------	32	I	Nolan	0	0	0	0	0	2,123	0	0	0	0	0	33.8
LTV Electrosystems------------------	36	I	Hunt	0	0	111	76	57	0	0	0	31.1	32.6	32.5	0
McAx Corp.--------------------------	NA	I	McLennan	87	0	0	0	0	0	26.4	0	0	0	0	0
Menasco Manufacturing Co.-----------	37	I	Tarrant	64	0	0	0	0	0	30.5	0	0	0	0	0
Mexia State School------------------	94	I	Limestone	0	133	127	112	114	117	0	32.3	33.2	37.2	37.6	40.6
McGraw Edison Power-----------------	49	I	Grayson	0	113	111	0	0	0	0	27.0	27.2	0	0	0
Mobil Pipe Line Co.-----------------	46	I	Eastland	0	0	0	92	96	85	0	0	0	36.8	36.3	39.8
Do----------------------------------	46	I	Erath	0	0	85	91	96	89	0	0	37.1	36.0	34.7	36.7
Do----------------------------------	46	I	Hill	0	0	96	93	111	101	0	0	32.8	34.1	32.7	35.9
Do----------------------------------	46	I	Mitchell	0	0	0	62	94	86	0	0	0	30.7	33.2	33.5
Do----------------------------------	46	I	Taylor	0	0	81	97	105	104	0	0	38.7	36.9	34.7	37.5
National Gypsum Co.-----------------	32	I	Fisher	439	530	586	721	849	979	27.4	27.3	27.4	25.4	28.6	35.1
North Fort Hood---------------------	97	I	Bell	0	0	0	0	58	0	0	0	0	0	46.4	0
Odell Greer Construction Co.--------	16	I	--do--	0	0	0	0	64	0	0	0	0	0	31.1	0
Owens Corning Fiberglass Corp.------	32	I	Ellis	526	602	657	652	0	0	24.6	24.6	24.2	24.0	0	0
Perrin Field (AFB)------------------	97	F	Grayson	217	208	206	126	0	0	38.9	39.7	41.2	42.6	0	0
Petrolite Corp.---------------------	29	I	Scurry	0	0	0	52	60	58	0	0	0	32.2	32.6	35.6

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Lone Star Gas Co.--Continued															
Post Engineer - Fort Hood	97	I	Bell	0	0	0	1,720	1,788	0	0	0	0	32.7	27.0	0
Potters Industries, Inc.	32	I	Brown	0	0	0	0	116	154	0	0	0	0	32.2	37.6
Radcliff Materials, Inc.	32	F	Harris	0	0	0	0	51	0	0	0	0	0	24.1	0
Reflex Glass Bead Co.	32	I	Brown	0	0	100	0	0	0	0	0	29.3	0	0	0
Rocketdyne Division	NA	I	McLennan	278	270	241	235	250	216	25.1	25.0	24.7	24.8	28.4	34.4
Round Rock Lime Co. - Blum Plant	32	I	Hill	341	337	473	576	520	556	25.2	24.9	24.1	23.9	27.6	29.7
Round Rock Lime Co. - Dolomite Plant	32	I	Williamson	515	545	536	581	596	650	24.6	24.2	24.1	23.8	27.4	33.0
San Angelo By-Products, Inc.	NA	I	Tom Green	113	114	122	149	141	116	26.0	26.1	26.8	26.5	30.1	32.8
Service Pipe Line Co.	46	I	Scurry	0	98	0	0	0	0	0	28.3	0	0	0	0
Southwestern Brick Co.	32	I	--do--	0	0	53	57	53	60	0	0	32.2	32.1	32.8	40.9
Strawn Materials Co., Inc.	NA	I	Palo Pinto	0	202	231	184	280	225	0	31.1	29.9	30.9	31.5	32.2
Superlock	NA	I	Navarro	0	0	0	0	81	0	0	0	0	0	30.2	0
Superock, Inc.	NA	I	Freestone	0	0	0	0	0	492	0	0	0	0	0	33.8
Teaque Brick and Tile Co.	32	I	--do--	231	237	195	82	259	254	25.6	25.6	25.1	24.6	28.8	34.8
Temco Electronics and Missile Co.	36	I	Hunt	96	87	0	0	0	0	28.0	28.9	0	0	0	0
Texas Department of Corrections	92	I	Walker	0	0	0	0	0	71	0	0	0	0	0	47.5
Texas Electric Service Co.	49	I	Mitchell	1,785	2,108	928	988	1,673	688	20.4	21.7	29.8	29.7	31.0	33.5
Texas Gypsum Co., Inc.	32	I	Dallas	317	324	273	488	479	0	26.1	21.8	26.4	25.8	28.9	0
Texas Industries, Inc.	32	I	Ellis	5,229	5,213	5,054	4,944	6,214	6,679	24.1	23.7	23.7	23.5	27.4	29.3
Texas Lime Co. - No. 1	32	I	Johnson	679	678	598	338	514	503	24.6	21.0	24.2	24.5	28.2	31.0
Texas Lime Co. - No. 2	32	I	--do--	542	671	1,435	1,592	1,898	1,913	24.7	21.1	23.5	23.2	26.6	30.2
Texas Pet Foods, Inc.	20	I	McLennan	0	0	0	0	0	56	0	0	0	0	0	45.0
Texas Power and Light Co. - Valley Plant	49	I	Fannin	16,316	24,325	21,356	22,059	18,251	19,540	21.9	23.0	22.3	22.0	22.1	23.5
Texas Power and Light Co. - River Crest	49	I	Red River	2,135	2,347	2,859	2,084	1,117	575	22.1	22.7	23.2	19.3	29.5	29.4
Texas Power and Light Co. Tradinghouse Creek	49	I	McLennan	0	0	0	0	4,985	24,789	0	0	0	0	24.5	24.4
Texas Rockwood Division	NA	I	Bell	256	312	301	387	443	0	25.2	24.9	24.6	24.3	26.9	0
The Flintkote Co.	32	I	Nolan	449	449	330	596	726	711	27.8	28.0	27.9	26.0	28.6	34.5
Trinity Portland Cement Co.	32	I	Tarrant	2,204	3,305	2,361	0	121	52	24.3	20.1	24.1	0	32.4	34.7
Union Texas Petroleum	28	I	Taylor	0	54	56	0	0	0	0	31.7	32.6	0	0	0
United States Gypsum Co.	32	I	Nolan	468	541	515	621	805	907	27.7	27.7	27.3	25.9	28.7	34.4
Universal Atlas Cement Co.	32	I	McLennan	1,476	1,427	2,116	2,046	2,576	2,801	23.6	23.2	23.0	22.9	26.4	32.4
Verson Alsteel Press Co.	35	I	Robertson	0	0	121	119	129	142	0	0	27.8	27.5	29.0	41.9
Veterans Administration Hospital	80	I	Kerr	79	73	81	72	62	51	28.3	29.1	31.4	32.6	32.4	38.1
Vitro Tech Corp.	NA	I	Robertson	72	109	0	0	0	0	27.3	27.3	0	0	0	0
Waco Aggregate Co.	32	I	McLennan	188	61	0	0	0	0	25.5	26.0	0	0	0	0
West Texas Clay Products	32	I	Comanche	131	135	135	142	156	150	30.6	27.9	27.6	27.2	31.6	33.6
West Texas Utilities - Lake Pauline Plant	49	I	Hardeman	1,310	0	1,713	1,404	1,483	2,392	23.4	0	24.6	24.7	25.9	28.3
Do	49	I	Henderson	0	1,404	0	0	0	0	0	24.1	0	0	0	0
West Texas Utilities - Nasworthy Plant	49	I	Tom Green	7,636	8,201	7,430	7,358	6,882	5,696	21.9	22.6	23.6	24.2	25.5	28.1
West Texas Utilities - Oak Creek Plant	49	I	Cooke	3,999	4,288	4,424	3,701	3,836	4,230	24.1	25.2	24.9	24.8	25.3	27.2
West Texas Utilities - Paint Creek Plant	49	I	Haskell	3,845	4,337	4,249	6,300	6,918	10,580	24.4	25.3	25.6	24.7	25.8	28.0
White's Mines, Inc.	14	I	Taylor	0	66	0	0	0	71	0	31.2	0	0	0	38.2
White Stone and Lime Co.	32	I	Williamson	179	0	0	0	0	0	25.7	0	0	0	0	0
Young Brothers, Inc.	NA	I	Brazos	0	0	56	0	53	0	0	0	32.0	0	33.1	0
H. B. Zachry Receiver	NA	I	Williamson	0	144	0	0	0	0	0	39.2	0	0	0	0
Sales less than 50,000 Mcf	NA	I	NA	1,393	1,294	1,271	2,026	22,382	1,676	32.3	49.3	49.6	49.6	26.5	55.6
Subtotal or average	-	-	-	70,202	81,526	79,233	79,758	110,704	115,122	23.8	24.2	24.4	24.5	26.0	28.3
Truckline Gas Co.:															
Sales less than 50,000 Mcf	NA	I	NA	9	7	5	9	0	13	36.2	32.9	39.4	36.2	0	34.3
Subtotal or average	-	-	-	9	7	5	9	0	13	36.2	32.9	39.4	36.2	0	34.3
United Gas Pipe Line Co.:															
Acme Brick Co.	32	F	Carrison	423	422	415	410	353	308	26.0	26.4	31.5	32.0	32.6	33.1
American Manufacturing Co. of Texas	35	F	Fort Worth	1,099	1,146	836	66	0	0	25.0	24.9	25.2	33.5	0	0

Table 4.--Main line sales to industrial users, by State, 1968-73--Continued

Texas

Company and customer	Customer SIC	Type of sale	Delivery point	Cas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
United Cas Pipe Line Co.--Continued															
Atlantic Richfield Co. and Cities Service Oil Co.	13	F	Rusk	0	0	0	0	211	123	0	0	0	0	32.7	34.5
Bay Prairie Aggregate Corp.	32	F	Wharton	59	293	235	376	557	506	26.3	26.2	26.2	25.3	25.4	25.8
du Pont de Nemours, E.I., and Co.	28	F	Orange	5,824	5,918	3,123	0	0	0	21.1	21.3	22.9	0	0	0
Equitable Bag Co., Inc. - Southern Div. and Paper Mill	26	F	--do--	1,116	1,130	726	0	0	0	21.6	22.5	25.7	0	0	0
Creat Lakes Carbon Corp.	13	F	Port Arthur	795	822	542	0	0	0	21.7	22.6	25.6	0	0	0
Gulf Oil Corp.	29	F	--do--	37,005	40,316	20,903	0	0	0	20.0	21.0	25.6	0	0	0
Henderson Clay Products, Inc.	32	F	Henderson	621	658	650	628	660	616	24.1	24.6	25.9	28.1	30.2	35.2
La Gloria Oil and Gas Co.	29	F	Tyler	796	902	0	0	0	0	24.1	24.5	0	0	0	0
Lone Star Cement Corp.	32	F	Dallas	778	0	0	0	0	0	23.9	0	0	0	0	0
McMurray Pipe Line Co.	46	F	Smith	0	0	0	50	52	0	0	0	0	37.0	37.5	0
Mobil Oil Corp.	29	F	Duncanville Road - Dallas	108	104	106	110	0	0	26.7	26.7	26.8	35.2	0	0
Murph Metals, Inc. 2/	29	F	Dallas	363	410	387	413	0	0	25.4	25.3	25.4	33.3	0	0
Reliance Clay Products Co.	32	F	Lindale	247	237	216	218	242	262	26.0	26.5	31.5	32.0	32.5	33.1
Resistol Rough Hat Corp.	23	F	Longview	59	0	0	0	0	0	31.7	0	0	0	0	0
Southland Paper Mills, Inc.	26	F	Lufkin	8,645	9,478	10,030	8,821	4,120	3,835	20.4	20.2	20.0	20.3	21.5	21.2
Sun Oil Co.	29	F	Nederland	71	79	65	0	0	0	26.4	27.1	30.4	0	0	0
Temple Industries, Inc.	24	F	Diboll	1,032	1,156	0	0	0	0	24.0	24.5	0	0	0	0
Texas Electric Cooperatives, Inc. Treating Div.	49	F	Jasper	56	69	72	60	0	51	32.2	31.5	36.5	37.0	0	38.0
Texas Pipe Line Co., The	46	F	Diboll	0	0	55	0	0	0	0	0	37.4	0	0	0
Union 76 Division, Union Oil Co. of California	29	F	Jcfferson	11,867	11,693	9,547	0	0	0	20.1	20.1	21.2	0	0	0
United States Steel Corp., United States Steel Products Div.	34	F	Port Arthur	82	70	0	0	0	0	25.9	27.0	0	0	0	0
Warren Petroleum Corp.	29	F	Rusk	57	0	0	0	0	51	31.7	0	0	0	0	37.0
Sales less than 50,000 Mcf	NA	F	NA	735	694	602	412	470	414	34.8	35.1	38.3	43.4	46.3	47.8
Subtotal or average	-	-	-	71,838	75,597	48,510	11,564	6,665	6,166	20.8	21.2	23.7	23.2	25.9	26.4
State total	-	-	-	172,873	189,096	157,336	113,751	127,097	130,841	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Formerly Livingston Oil Co.
2/ Formerly Southern Lead Co., Inc.

Table 4.--Main line sales to industrial users, by State, 1968-73

Virginia

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf 1968	1969	1970	1971	1972	1973	Price, cents per Mcf 1968	1969	1970	1971	1972	1973
Shenandoah Gas Co.:															
M. J. Grove Lime Co.	32	I	Stephens City	212	242	215	241	252	235	51.2	51.0	52.0	55.6	57.3	61.6
Do	32	F	--do--	195	193	193	194	196	194	56.2	56.6	58.1	64.1	65.7	69.4
Howell Metal Co.	34	F	New Market	5	10	16	20	24	26	96.4	83.8	84.6	92.2	94.9	97.8
Do	34	I	--do--	0.1	0	0	0	0	0	73.7	0	0	0	0	0
Subtotal or average	-	-	-	412	445	424	455	472	455	54.1	54.2	56.0	60.8	62.7	67.0
Transcontinental Gas Pipeline Corp.															
1 customer	NA	1/	NA	1	6	0	0	0	0	22.8	22.7	0	0	0	0
Subtotal or average	-	-	-	1	6	0	0	0	0	22.8	22.7	0	0	0	0
State total	-	-	-	413	451	424	455	472	455	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.
1/ Purge and test.

Table 4.--Main line sales to industrial users, by State, 1968-73

Washington

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
El Paso Natural Gas Co.:															
Phillips Pacific Chemical Co.--------	28	I	Hedges	6	7	0	0	0	0	36.5	36.6	0	0	0	0
Do----------------------------------	28	F	--do--	4,578	4,189	3,752	4,111	4,950	5,042	38.8	38.8	38.6	42.5	44.2	44.1
Subtotal or average-------------	-	-	-	4,584	4,196	3,752	4,111	4,950	5,042	38.8	38.8	38.6	42.5	44.2	44.1
State total--------------------	-	-	-	4,584	4,196	3,752	4,111	4,950	5,042	NAp	NAp	NAp	NAp	NAp	NAp

NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

West Virginia

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
Cumberland and Allegheny Gas Co.:															
Flex-o-Lite Mfg. Corp.---------------	32	F	Mineral County	234	173	173	0	0	0	57.4	59.9	57.4	0	0	0
Kingsford Co.------------------------	28	F	Tucker County	111	109	112	0	0	0	64.0	64.9	62.3	0	0	0
West Virginia Pulp and Paper Co.-----	26	F	Piedmont Dist.	744	606	434	0	0	0	51.7	52.4	52.5	0	0	0
Sales less than 50,000 Mcf-----------	NA	F	NA	23	4	0	0	0	0	74.4	87.2	0	0	0	0
Subtotal or average-------------	-	-	-	1,112	892	719	0	0	0	54.6	55.5	55.2	0	0	0
Inland Gas Co.:															
A.C.F. Industries--------------------	34	F	Huntington	0	0	81	87	77	74	0	0	52.0	56.4	60.6	61.1
American National Rubber Co.---------	30	F	Ceredo	0	0	0	0	52	69	0	0	0	0	57.2	57.4
Chemetron Corp.----------------------	28	F	Huntington	0	0	621	414	226	629	0	0	41.6	50.9	55.1	55.0
Sales less than 50,000 Mcf-----------	NA	F	NA	0	0	47	54	0	0	0	0	49.6	55.7	0	0
Subtotal or average-------------	-	-	-	0	0	749	555	355	772	0	0	43.2	52.2	56.7	55.8
Manufacturers Light and Heat Co.:															
Air Products and Chemicals, Inc.-----	28	F	Weirton	0	274	198	0	0	0	0	59.4	59.6	0	0	0
Celotex Div.-Jim Walter Corp.--------	26	F	Chester	134	138	114	0	0	0	61.3	61.7	61.2	0	0	0
Centre Foundry and Machine-----------	33	F	Wheeling	0	64	53	0	0	0	0	66.1	65.4	0	0	0
Crescent Brick Co. - Div. of Resco Products---------------------------	32	F	New Cumberland	114	177	137	0	0	0	61.2	59.3	59.2	0	0	0
Globe Brick Co.----------------------	32	F	Grant District	872	261	0	0	0	0	54.1	53.8	0	0	0	0
Globe Refractories-------------------	32	F	--do--	0	951	1,013	0	0	0	0	53.6	53.5	0	0	0
Viking Glass Co.---------------------	32	F	New Martinsville	209	0	0	0	0	0	60.6	0	0	0	0	0
Weirton Steel Co.--------------------	33	F	Weirton	4,481	4,738	3,401	0	0	0	54.4	54.1	54.6	0	0	0
Wheeling-Pittsburgh Steel Co.--------	33	F	Benwood	0	0	725	0	0	0	0	0	55.5	0	0	0
Wheeling Steel Corp.-----------------	33	F	Wheeling	759	829	0	0	0	0	55.5	55.6	0	0	0	0
Sales less than 50,000 Mcf-----------	NA	F	NA	231	77	85	0	0	0	66.5	69.5	66.7	0	0	0
Subtotal or average-------------	-	-	-	6,800	7,509	5,726	0	0	0	55.3	54.9	55.2	0	0	0
Shenandoah Gas Co.:															
Continental Clay Prod. Co.----------	32	I	Martinsburg	125	157	154	152	171	203	53.9	53.2	54.0	58.0	59.3	63.9
Do--------------------------------	32	F	--do--	0.1	0.1	0.1	0.1	0.1	0	145.3	143.9	142.4	147.8	147.1	0
Corning Glass Works, Inc.-----------	32	I	Inwood	356	345	271	248	277	348	44.9	45.4	46.0	49.4	51.6	56.2
Do--------------------------------	32	F	--do--	482	542	594	585	624	617	51.2	51.5	53.5	60.8	60.9	64.0
Lockheed Ga. Devl. Co. of America---	NA	F	--do--	5	5	5	3	0	0	86.7	86.5	86.2	84.9	0	0
Minnesota Mng. and Mfg. Co.---------	28	I	Middleway	189	183	219	217	217	223	55.9	56.0	56.7	60.6	62.3	66.7
C.H. Musselman Co.------------------	20	F	Inwood	4	3	2	1	0	0	87.8	89.9	95.8	95.6	0	0
Do--------------------------------	20	I	--do--	63	80	70	65	64	60	52.0	50.9	51.4	51.5	51.6	52.0
Subtotal or average------------	-	-	-	1,224	1,315	1,315	1,271	1,353	1,451	50.7	50.9	52.6	57.8	58.6	62.0
United Fuel Gas Co.:															
E.I. du Pont de Nemours and Co.-----	28	I	Belle	16,057	15,567	10,803	0	0	0	38.2	38.1	40.1	0	0	0
Kaiser Aluminum and Chem. Corp.-----	33	I	Ravenswood	4,317	3,979	2,890	0	0	0	40.3	40.2	42.3	0	0	0
Novamont Corp.----------------------	22	I	Neal	67	110	53	0	0	0	48.6	47.4	50.6	0	0	0
Subtotal or average------------	-	-	-	20,441	19,656	13,746	0	0	0	38.7	38.6	40.6	0	0	0
State total--------------------	-	-	-	29,577	29,372	22,255	1,826	1,708	2,223	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

Table 4.--Main line sales to industrial users, by State, 1968-73

Company and customer	Customer SIC	Type of sale	Delivery point	Gas sales, MMcf						Price, cents per Mcf					
				1968	1969	1970	1971	1972	1973	1968	1969	1970	1971	1972	1973
El Paso Natural Gas Co.:															
San Francisco Chemical Co.----------	28	F	Sage	267	326	104	0	0	0	40.1	40.1	40.2	0	0	0
Stauffer Chemical Co.---------------	28	F	--do--	0	0	320	512	562	539	0	0	40.2	42.6	44.3	44.4
Subtotal or average------------	-	-	-	267	326	424	512	562	539	40.1	40.1	40.2	42.6	44.3	44.4
Kansas-Nabraska Natural Gas Co.:															
Colorado Fuel & Iron Co.------------	10	I	Sunrise	268	248	263	304	317	305	30.2	29.9	29.8	30.0	36.6	43.8
Holly Sugar Corp.-------------------	20	I	Torrington	673	744	1,001	660	845	862	30.0	29.7	29.6	32.5	36.5	43.8
Sales less than 50,000 Mcf----------	NA	I	NA	0	0	0	0	5	9	0	0	0	0	46.2	47.1
Subtotal or average------------	-	-	-	941	992	1,264	964	1,167	1,176	30.0	29.8	29.6	31.7	36.5	43.8
Montana-Dakota Utilities Co.:															
Amoco Production Co.----------------	13	I	Midwest	0	0	0	65	55	0	0	0	0	39.1	39.1	0
Do----------------------------------	13	I	Torchlight	0	0	0	127	94	94	0	0	0	31.2	31.2	36.0
Federal Bentonite Co.---------------	14	I	Colony	164	219	208	202	206	236	35.9	36.0	36.0	36.1	36.6	38.0
Georgia Pacific---------------------	24	I	Himes	0	0	0	216	328	412	0	0	0	31.0	31.0	35.8
Do----------------------------------	24	I	Lovell	0	194	194	0	0	0	0	29.4	31.0	0	0	0
Great Western Sugar Co.-------------	20	I	--do--	683	764	832	831	942	889	29.4	29.4	31.0	31.0	31.1	35.8
Holly Sugar Corp.-------------------	20	I	Worland	643	721	961	793	876	898	29.5	29.5	31.2	31.2	31.2	36.0
International Minerals & Chemical Corp.	14	I	Colony	125	166	161	166	181	227	35.9	36.0	36.0	36.1	36.6	38.0
National Lead Co.-------------------	14	I	--do--	127	135	132	134	129	174	35.9	36.0	36.0	36.1	36.6	38.1
Pan-Am Petroleum Corp.--------------	13	I	Big Horn	111	0	0	0	0	0	30.0	0	0	0	0	0
Do----------------------------------	13	I	Midwest	76	64	64	0	0	0	38.2	39.1	39.1	0	0	0
Shell Oil Co.-----------------------	13	I	Buffalo	236	139	102	166	178	171	39.4	39.1	39.1	39.0	39.0	39.0
Texaco Co.--------------------------	13	I	Kaycee	83	80	87	84	55	67	38.4	39.1	39.2	39.2	39.1	41.5
Wyo-Ben Products Co.----------------	14	I	Greybull	97	86	117	95	84	92	29.5	29.5	31.2	31.2	31.2	36.2
Sales less than 50,000 Mcf----------	NA	I	NA	72	0	0	0	0	50	39.1	0	0	0	0	39.1
Subtotal or average------------	-	-	-	2,417	2,568	2,858	2,879	3,128	3,310	32.4	31.8	32.7	32.8	32.8	36.6
Northern Utilities, Inc.:															
Terra Resources---------------------	29	I	30 miles north of Casper	323	320	274	NA	NA	220	20.6	23.0	23.2	NA	NA	23.2
Federal Resources-------------------	13	I	40 miles east of Riverton	110	92	76	NA	NA	72	24.7	24.7	24.7	NA	NA	33.5
Union Carbide-----------------------	10	I	1 mile east of Natrona-Fremont County Line	21	25	29	NA	NA	28	24.7	24.7	24.7	NA	NA	34.5
Little America Refinery-------------	29	I	2 1/2 miles east of Casper	298	610	863	NA	NA	893	21.9	22.2	22.5	NA	NA	24.3
Utah Const. & Mining Co.------------	10	I	31 miles east of Sand Draw	112	112	117	NA	NA	0	24.7	24.7	24.7	NA	NA	0
Utah International Inc. 1/----------	10	I	--do--	0	0	0	NA	NA	122	0	0	0	NA	NA	33.6
Pan American - Salt Creek-----------	13	I	38 miles north of Casper	0	1	363	NA	NA	0	0	22.0	22.9	NA	NA	0
Pan American - Winkleman------------	13	I	30 miles west of Riverton	397	353	635	NA	NA	0	24.5	24.5	23.4	NA	NA	0
American Oil Co.--------------------	29	I	1 mile west of Casper	4,307	4,582	4,992	NA	NA	5,026	20.6	21.1	21.9	NA	NA	25.8
Texaco Dugout-----------------------	13	I	55 miles north of Casper	30	33	53	NA	NA	57	33.7	33.7	33.7	NA	NA	34.5
Texas Company Refinery--------------	29	I	2 miles east of Casper	1,161	912	999	NA	NA	1,717	21.8	22.1	23.0	NA	NA	27.0
Western Nuclear---------------------	10	I	2 miles south west of Riverton	6	4	3	NA	NA	4	35.7	36.6	40.9	NA	NA	40.3
Amoco-Winkleman---------------------	13	I	30 miles west of Riverton	0	0	0	NA	NA	376	0	0	0	NA	NA	23.8
Amoco-Winkleman - Beaver Creek------	13	I	--do--	0	0	0	NA	NA	899	0	0	0	NA	NA	29.8
Amoco - Salt Creek------------------	13	I	38 miles north of Casper	0	0	0	NA	NA	1,021	0	0	0	NA	NA	26.9
Subtotal or average------------	-	-	-	6,765	7,044	8,404	NA	NA	10,435	21.3	21.8	22.4	NA	NA	26.4
State total-------------------	-	-	-	10,390	10,930	12,950	4,355	4,857	15,460	NAp	NAp	NAp	NAp	NAp	NAp

NA Not available. NAp Not applicable.

1/ Formerly Utah Construction and Mining Co.

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Basic Estimated Capital Investment and Operating Costs for Underground Bituminous Coal Mines

Mines With Annual Production of 1.03 to 3.09 Million Tons From a 48-Inch Coalbed

Revision of Information Circular 8641

UNITED STATES DEPARTMENT OF THE INTERIOR

U.S Bureau of Mines.

Information Circular 8689

Basic Estimated Capital Investment and Operating Costs for Underground Bituminous Coal Mines

Mines With Annual Production of 1.03 to 3.09 Million Tons From a 48-Inch Coalbed

Revision of Information Circular 8641

By Sidney Katell, E. L. Hemingway, and L. H. Berkshire
Process Evaluation Group–MMRD, Morgantown, W. Va.

March 3 1849

UNITED STATES DEPARTMENT OF THE INTERIOR
Kent Frizzell, Acting Secretary

Jack W. Carlson, Assistant Secretary–Energy and Minerals

BUREAU OF MINES
Thomas V. Falkie, Director

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As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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BASIC ESTIMATED CAPITAL INVESTMENT AND OPERATING COSTS FOR UNDERGROUND BITUMINOUS COAL MINES

Mines With Annual Production of 1.03 to 3.09 Million Tons From a 48-Inch Coalbed

Revision of Information Circular 8641

by

Sidney Katell,[1] E. L. Hemingway,[2] and L. H. Berkshire[3]

ABSTRACT

This Bureau of Mines study estimates capital investment, operating costs, and selling prices for three underground bituminous mines producing coal with annual production ranging from 1.03 to 3.09 million tons. It is assumed that the mines have a 20-year life. Wages and union welfare payments are considered as of December 6, 1974, under the Bituminous Wage Agreement of 1974, and costs for material and equipment are based on 1975 indexes.

Initial capital investment ranges from $26,498,500 for the 1.03-million-ton-per-year (MM tpy) mine to $67,173,300 for the 3.09-MM-tpy mine. Total capital investment ranges from $37,437,500 to $92,984,300 for the same mines. Corresponding selling prices for the coal range from $14.83 to $13.26 per ton, assuming a 15-percent discounted cash flow rate of return after Federal income taxes.

INTRODUCTION

Growing public concern about the increasing demand for energy has brought about a renewed interest in coal production in the United States. Because cost is an important factor in determining the extent to which coal will be used to satisfy this energy requirement, the Bureau of Mines is preparing a series of reports that provide estimated capital investment and operating costs for hypothetical mines that may be utilized in the production of synthetic fuels or for electric utility plants.

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[1] Chief, Process Evaluation Group.
[2] Mining engineer.
[3] Economist.

Three studies that presented capital investment and operating costs for coal mines, based on rates in effect under the Bituminous Wage Agreement of 1971, were published in 1974.[4] This report is the second of a new series that updates the previous publications to reflect wage and union welfare rates that went into effect December 6, 1974, under the Bituminous Wage Agreement of 1974. Costs for material and equipment are based on January 1975 cost indexes, and selling prices are based on a 15-percent discounted cash flow (DCF) rate of return after Federal income taxes. Mines are assumed to have a 20-year life.

This study presents basic capital investment and production costs for three hypothetical underground bituminous coal mines with a 48-inch working height and with annual production ranging from 1.03 to 3.09 million tons of coal. Since costs are affected by many factors, any particular mine, in reality, will have to be considered in relation to its own special situation and requirements.

GENERAL MINING PLAN

It is assumed that the mines operate 5 days per week, 3 shifts per day, 220 days per year, and have a 20-year life. Continuous miner sections produce 312 tons of coal per unit per shift.

Acres of surface needed to produce the required tonnages are calculated assuming 1,800 tons of coal per acre-foot with 4 feet of mining height and 57-percent recovery. Table 1 shows the acreage requirements to sustain a 20-year mining operation.

TABLE 1. - Acreage required to provide coal resources necessary to sustain a 20-year mining operation

Production, MM tpy	Acres required, 57-percent recovery
1.03	5,018
2.06	10,035
3.09	15,053

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[4] Katell, Sidney, and E. L. Hemingway. Basic Estimated Capital Investment and Operating Costs for Underground Bituminous Coal Mines: Mines With Annual Production of 1.06 to 4.99 Million Tons From a 72-Inch Coalbed. BuMines IC 8632, 1974, 41 pp.
_____. Basic Estimated Capital Investment and Operating Costs for Underground Bituminous Coal Mines: Mines With Annual Production of 1.03 to 3.09 Million Tons From a 48-Inch Coalbed. BuMines IC 8641, 1974, 31 pp.
_____. Basic Estimated Capital Investment and Operating Costs for Coal Strip Mines. BuMines IC 8661, 1974, 31 pp.

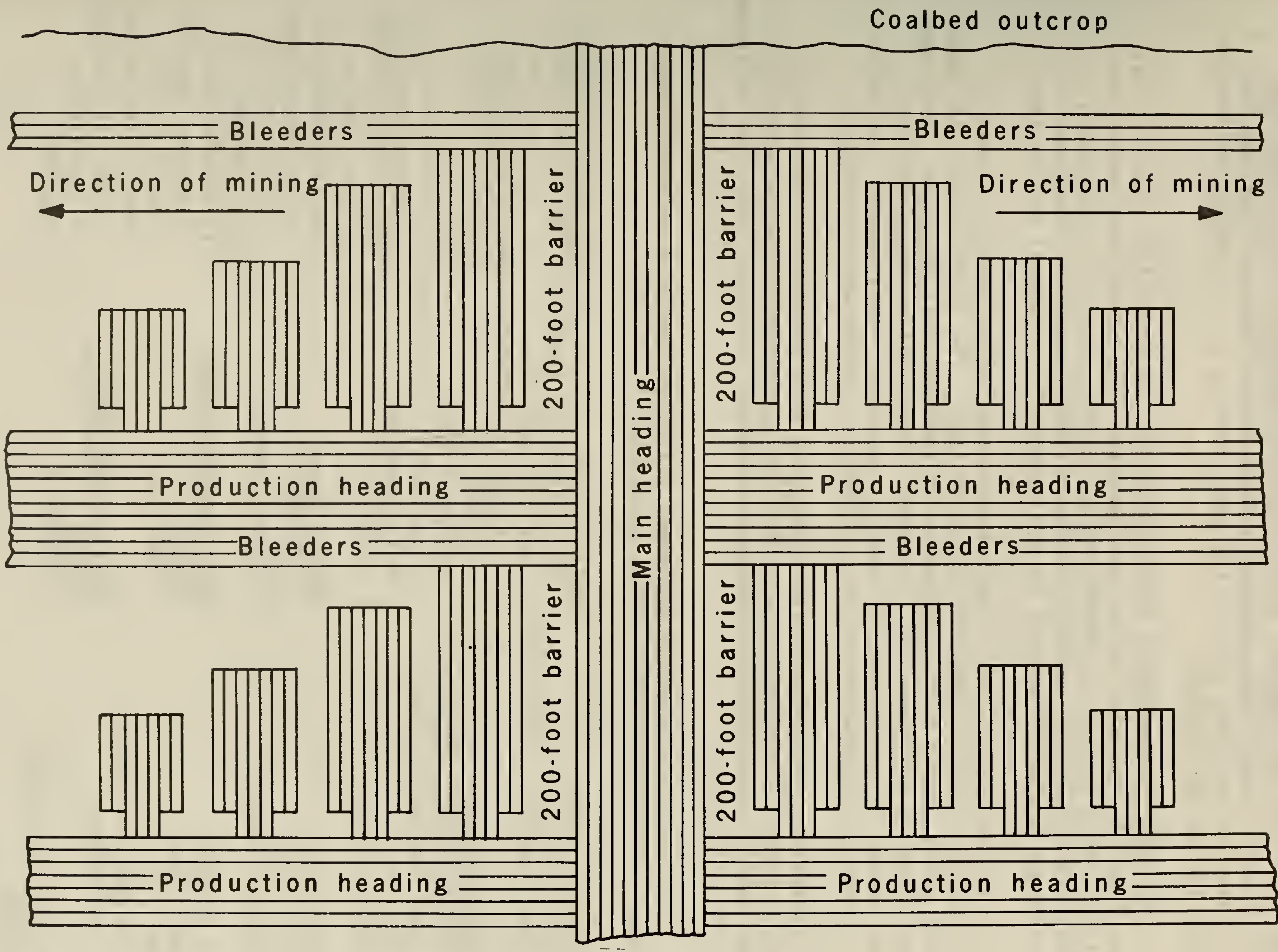

FIGURE 1. - General mining plan.

The general mining plan involves driving main entries along the center axis of the property with production headings on the right and left. All mining is concentrated on one side of the main heading, the plan being to mine one side of the main entries on the advance and the other side on the retreat.

The main headings have 11 entries, and the production headings have 8 entries, 14 feet wide on 95-foot centers. The production panels are on the 8-entry system, 16 feet wide on 95-foot centers. Production panels are 2,600 feet long plus an additional length for development of the bleeder system. Figure 1 is a diagram of the general mining plan.

Each loading unit will consist of a continuous miner, a loading machine, two shuttle cars, and a roof bolter. The shuttle cars will dump into a ratio feeder at the tailpiece of the unit belt conveyor. Unit manpower consists of 10 men and a foreman. Each unit is equipped with a power center to reduce high voltage to equipment requirements. A rectifier converts alternating current to direct current where necessary.

Coal is transported to the surface by belt conveyors. Main heading conveyors are 42 inches wide except for those in the 1.03-MM-tpy mine, which are 36 inches wide. Production headings and panel belts are 36 inches wide for all mines.

The following detailed equipment list describes the principal pieces of equipment that will be used in the mines:

Continuous miner
Hp: 220.
Drive: Motor.

Loading machine
Loading rate: 25/30 tons per minute (tpm).
Hp: 160.
Drive: Motor.

Shuttle car
Hp: 100.
Drive: Motor.

Roof bolter
Dual boom.
Hp: 50.
Equipped with dust collector.

Rectifier for track haulage
1,000 kW.

Ratio feeder
Can accept 15+ tons of coal and discharge at desired rate.
Equipped with lumpster.
Self-tramming.
Hp: 125.

Supply motor
Hp: 80.
Drive: Motor.

Mainline belt power center
300 kV-A.

Section belt power center
150 kV-A.

Section rectifier
200 kV-A.

Triple duty rock duster
Hp: 30.

Main ventilation fan
Type: Dual.
Size: 8 ft.
350,000 cfm at 6-inch water gage.

Auxiliary fan
To provide more effective ventilation at working face. Size of fan varies with amount of ventilation required.

Information supporting the cost figures in this study is included in tables that make up appendixes A, B, and C for the 1.03-, 2.06-, and 3.09-MM-tpy mines, respectively. The following tables are included for each of the mines.

Table	
1	Capital investment summary
2	Manning table
3	Depreciation schedule
4	Power and water cost
5	Estimated annual production cost
6	Estimated development cost
7	Estimated working capital and total capital investment
8	Summary of discounted cash flow
9	Discounted cash flow

SUMMARY

This study furnishes cost analyses for three hypothetical underground bituminous mines that produce 1.03, 2.06, and 3.09 MM tpy of coal. A summary of the total capital investments, operating costs, and selling prices is given in table 2.

TABLE 2. - Summary of capital investment, operating costs, and selling price by annual output capacity

MM tons per year..........	1.03	2.06	3.09
Estimated initial capital investment...............	$26,498,500	$46,054,400	$67,173,300
Estimated deferred capital investment...............	10,939,000	18,100,500	25,811,000
Total.................	37,437,500	64,154,900	92,984,300
Capital investment per ton of production............	36.36	31.16	30.10
Operating cost per year....	9,803,600	18,110,500	26,577,700
Operating cost per ton of production...............	9.52	8.79	8.61
Selling price per ton, 15 percent DCF[1]..........	14.83	13.56	13.26

[1] Discounted cash flow.

APPENDIX A - 1.03-MM-tpy mine

TABLE A-1. - Capital investment summary, 1.03-MM-tpy mine

Item	Quantity	Total cost
Continuous miner	6	$1,222,500
Loading machine	6	472,500
Shuttle car	12	735,000
Roof bolter	7	385,000
Ratio feeder	6	270,000
Auxiliary fan	7	26,300
Mantrip Jeep[1]	5	87,500
Mechanic Jeep	3	41,300
Personnel Jeep	4	50,000
Trickle rock duster	7	30,600
Triple duty rock duster	7	271,300
Supply motor	3	93,800
Supply car	30	93,800
36-inch rope-type belt conveyor	26,740 ft	1,771,500
Mainline belt power center (300 kV-A)	5	93,800
Section belt power center (150 kV-A)	5	62,500
Section power center (1,000 kV-A)	6	172,500
Section rectifier (200 kW)	6	15,000
Section switch house	6	56,300
Sectionalizing switch house	7	65,600
High voltage (HV) cable (300 million circular mill aluminum {MCM AL})	12,000 ft	112,500
PLM[1] coupler	15	14,600
Section cable and coupler	-	46,600
Rectifier for track haulage	1	25,000
Trolley wire	24,740 ft	77,400
Track (60-lb)	24,740 ft	247,400
Fresh water line	24,740 ft	92,800
Pumps and lines	-	18,800
Telephone (page phones)	-	8,800
Conveyor fire protection	-	25,000
Automatic controls and alarms	-	50,000
Scoop tractor	7	218,800
Battery charger	7	17,500
All service mask	12	1,500
Breathing apparatus	12	9,400
Self rescuer	300	11,200
Stretcher set	8	1,300
Safety light	100	4,400
Methanometer	100	37,500
Fire chemical car	4	15,000
Lamp (including accessories)	250	13,100
Dust sampler	20	7,500
Site preparation	-	25,000
Ventilation fan (dual)	1	115,000

TABLE A-1. - Capital investment summary, 1.03-MM-tpy mine--Continued

Item	Quantity	Total cost
Concrete portal	5	$87,500
Rock dust facility	1	18,800
Substation and distribution	1	100,000
Bathhouse, office, and lamp house	1	350,000
Shop and warehouse	1	187,500
Powder and cap house	1	6,000
Front-end loader	1	63,000
Forklift	1	44,000
Bulldozer	1	100,000
Utility truck	1	9,000
Pickup truck	1	6,000
Oil storage	1	12,000
Water tank	1	12,000
Supply yard	1	15,000
Mine drainage treatment plant	-	37,500
Exploration	-	65,000
Total direct		8,326,200
Field indirect		166,500
Total construction		8,492,700
Engineering		169,900
Overhead and administration		433,100
		9,095,700
Contingency		1,364,400
		10,460,100
Fee		209,200
		10,669,300
Estimated development cost		5,385,300
		16,054,600
Interest during development		802,700
		16,857,300
Credit for coal mined during development at $10 per ton.		6,044,000
		10,813,300
Land acquisition at $2,500 per acre		12,545,000
Net estimate		23,358,300

[1] Reference to specific trade names in this report is done to facilitate understanding and does not imply endorsement by the Bureau of Mines.

TABLE A-2. - Manning table, 1.03-MM-tpy mine

Personnel	Total	Wages[1] per day	Cost per year	Cost per ton
Underground:				
Continuous miner operator...	15	$55.00	$184,580	
Loading machine operator....	15	51.98	174,614	
Machine operator helper.....	15	51.98	174,614	
Shuttle car operator........	30	49.23	331,078	
Roof bolter.................	30	55.00	369,160	
Bratticeman.................	15	47.03	158,279	
Utility man.................	15	49.23	165,539	
Mechanic (section)..........	15	55.00	184,580	
	150		1,742,400	$1.69
Supply motorman.............	4	47.58	43,398	
Beltman.....................	9	47.03	94,968	
Trackman....................	6	47.03	63,311	
Wireman.....................	6	47.03	63,311	
Mason (precision)...........	6	49.23	66,215	
Pumper......................	3	47.03	31,657	
Utility crew................	9	49.23	99,324	
Roving mechanic.............	6	55.00	73,568	
Fireboss (union)............	3		36,916	
	52		572,668	.56
Outside:				
Lampman.....................	3	45.38	30,568	
Front-end loader operator...	2	47.85	21,318	
Shop mechanic...............	6	49.50	66,572	
	11		118,458	.11
Salary:				
Superintendent..............	1	-	26,400	
General mine foreman........	1	-	17,400	
Assistant mine foreman......	3	-	43,200	
Section foreman.............	15	-	203,000	
Maintenance superintendent..	1	-	19,800	
General shop foreman........	1	-	13,800	
Mine maintenance foreman....	3	-	41,400	
Chief mine engineer.........	1	-	20,400	
Draftsman...................	1	-	8,400	
Survey crew.................	3	-	27,000	
Safety director.............	1	-	18,000	
Safety inspector............	3	-	39,600	
Dust sampler................	3	-	28,800	
Office manager..............	1	-	14,400	
Timekeeper and bookkeeper...	1	-	10,000	
Purchasing supervisor.......	1	-	14,400	
Warehouseman................	4	-	36,000	
	44		582,000	.57
Total labor and supervision	257		3,015,600	2.93

---

[1] Figures in this column are for the day shift. Shift differentials for other shifts are reflected in the cost per year.

TABLE A-3. - Depreciation schedule, 1.03-MM-tpy mine

Item	Straight-line depreciation, years	Yearly charge
Exploration	20	$3,300
Mine drainage treatment plant	10	3,800
Supply yard	10	1,500
Water tank	10	1,200
Oil storage	10	1,200
Pickup truck	5	1,200
Utility truck	5	1,800
Bulldozer	10	10,000
Forklift	10	4,400
Front-end loader	10	6,300
Powder and cap house	10	600
Shop and warehouse	20	9,400
Bathhouse, office, and lamp house	20	17,500
Substation	20	5,000
Bulk rock dust facility	10	1,900
Concrete portals	20	4,400
Ventilation fan	20	5,800
Site preparation	20	1,300
Coal mine safety equipment	5	35,200
Underground equipment	10	689,700
Interim equipment replacement	20	158,000
Subtotal		963,500
Depreciation for field indirect, engineering, overhead and administration, contingency, fee, cost of development, and interest during development, less credit for coal mined at $10 per ton	20	101,500
Total		[1]1,065,000

[1] $1.03 per ton.

TABLE A-4. - Power and water cost, 1.03-MM-tpy mine

Number of units	Operation	Hp per unit	Hp, total load	Hr per day, full load	KW, total load	Total kW-hr requirement
5	Continuous miner....	220	1,100	15	820	12,300
5	Loading machine.....	160	800	15	597	8,955
10	Shuttle car.........	100	1,000	15	746	11,190
5	Roof bolter.........	50	250	18	187	3,366
5	Ratio feeder........	125	625	15	466	6,990
5	Auxiliary fan.......	30	150	18	112	2,016
5	Mantrip Jeep........	15	75	6	56	336
3	Mechanic Jeep.......	15	45	15	34	510
4	Personnel Jeep......	7.5	30	15	22	330
7	Rock duster.........	30	210	12	157	1,884
3	Supply motor........	80	240	12	179	2,148
10	36-inch conveyor....	85	850	15	634	9,510
1	Ventilation fan.....	500	500	24	373	8,952
	Extra for pumps, lights, tools, etc.		400	10	298	2,980
	Total....................................					71,467

NOTE. - Power: $0.02 x 71,467 x 220 = $314,400 ÷ 1,029,600
= $0.30 per ton.
Water: 3,000 gal per unit per shift at $0.10 per M gal
= 3,000 x 15 x 220 x 0.10 ÷ 1,000 = $1,000.

TABLE A-5. - Estimated annual production cost, 1.03-MM-tpy mine

	Annual cost	Cost per ton
Direct cost:		
Production:		
Labor	$2,108,900	$2.05
Supervision	507,000	.49
	2,615,900	2.54
Maintenance:		
Labor	324,700	.32
Supervision	75,000	.07
	399,700	.39
Operating supplies:		
Mining machine parts	648,600	.63
Lubrication and hydraulic oil	257,400	.25
Rock bolts and timber	319,200	.31
Rock dust	133,900	.13
Ventilation	195,600	.19
Bits	123,600	.12
Cables	61,800	.06
Miscellaneous	154,400	.15
	1,894,500	1.84
Power	314,400	.30
Water	1,000	
Payroll overhead (40 percent of payroll).	1,206,200	1.17
Union welfare[1]	1,099,300	1.07
Indirect cost:		
15 percent labor, supervision, and supplies	736,500	.72
Fixed cost:		
Taxes and insurance, 2 percent of mine cost	471,100	.46
Depreciation	1,065,000	1.03
	1,536,100	1.49
Total	9,803,600	9.52

[1] Effective Dec. 6, 1974, under the Bituminous Wage Agreement of 1974.

TABLE A-6. - Estimated development cost,[1] 1.03-MM-tpy mine

Item	Total cost	Cost per ton
Total labor and supervision	$2,228,800	$3.69
Operating supplies	680,000	1.13
Power	120,900	.20
Payroll overhead	891,500	1.47
Union welfare	634,600	1.05
Indirect cost	436,600	.72
Fixed cost	392,900	.65
Total	5,385,300	8.91

[1] Estimated development cost covers the period of time required to place all units in operation within the projected mining plan.

NOTE. - Cost per ton = $8.91.
Tonnage = 604,400.
Credit for coal mined at $10 per ton = $6,044,000.

TABLE A-7. - Estimated working capital and total capital investment, 1.03-MM-tpy mine

Estimated working capital:		
Direct labor	3 months	$753,900
Operating supplies	3 months	473,600
Payroll overhead	3 months	301,600
Indirect cost	4 months	245,500
Fixed cost	0.5 percent of insurance base	117,800
Spare parts		218,800
Miscellaneous		29,000
Total working capital		2,140,200
Total estimated capital investment:		
Total mine cost (insurance, tax base)		$23,555,600
Interest during development		802,700
Subtotal		24,358,300
Working capital		2,140,200
Estimated capital investment		26,498,500
Estimated deferred capital investment		10,939,000
Total capital investment and deferred investment.		[1]37,437,500

[1] This is an average cost of $36.36 per ton of annual production.

TABLE A-8. - Summary of discounted cash flow, 1.03-MM-tpy mine

Year	Capital investment	Cash flow	Present worth factor at 15 percent	Present worth capital investment at 15 percent	Present worth cash flow value at 15 percent
0	$26,498,500	$-26,498,500	1.	$26,498,500	$-26,498,500
1	158,000	4,401,400	.8696	137,400	3,827,500
2	158,000	4,401,400	.7561	119,500	3,327,900
3	158,000	4,401,400	.6575	103,900	2,893,900
4	158,000	4,401,400	.5718	90,300	2,516,700
5	349,000	4,210,400	.4972	173,500	2,093,400
6	158,000	4,401,400	.4323	68,300	1,902,700
7	158,000	4,401,400	.3759	59,400	1,654,500
8	158,000	4,401,400	.3269	51,700	1,438,800
9	158,000	4,401,400	.2843	44,900	1,251,300
10	7,555,000	-2,995,600	.2472	1,867,600	-740,500
11	158,000	4,401,400	.2149	34,000	945,900
12	158,000	4,401,400	.1869	29,500	822,600
13	158,000	4,401,400	.1625	25,700	715,200
14	158,000	4,401,400	.1413	22,300	621,900
15	349,000	4,210,400	.1229	42,900	517,500
16	158,000	4,401,400	.1069	16,900	470,500
17	158,000	4,401,400	.0929	14,700	408,900
18	158,000	4,401,400	.0808	12,800	355,600
19	158,000	4,401,400	.0703	11,100	309,400
20	-14,527,200	19,086,600	.0611	-887,600	1,166,200
				28,537,300	1,400

TABLE A-9. - Discounted cash flow, 1.03-MM-tpy mine

15 percent - 20 years

R = $28,537,300 ÷ 6.259[1] = $4,559,400
less depreciation 1,065,000
Depletion + net profit = 3,494,400

Depletion = 10 percent of sales
Federal income tax = net profit
Depletion + net profit = cash flow - depreciation

Sales = 1/0.55 (1/2 operating cost + cash flow - depreciation)
= 1/0.55 (4,901,800 + 3,494,400)

Sales....................	$15,265,800
Operating cost..........	9,803,600
Gross profit............	5,462,200
Depletion...............	1,526,600
Taxable income..........	3,935,600
Federal income tax......	1,967,800
Net profit..............	1,967,800

Annual cash flow = net profit + depreciation + depletion
= $1,967,800 + $1,065,000 + $1,526,600
= $4,559,400

Selling price per ton = $15,265,800 ÷ 1,029,600 = $14.83

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[1] Uniform series present worth factor.

APPENDIX B.--2.06-MM-tpy mine

TABLE B-1. - Capital investment summary, 2.06-MM-tpy mine

Item	Quantity	Total cost
Continuous miner	12	$2,445,000
Loading machine	12	945,000
Shuttle car	24	1,470,000
Roof bolter	14	770,000
Ratio feeder	12	540,000
Auxiliary fan	14	52,500
Mantrip Jeep	10	175,000
Mechanic Jeep	5	68,800
Personnel Jeep	6	75,000
Trickle rock duster	14	61,300
Triple duty rock duster	14	542,500
Supply motor	5	156,300
Supply car	50	156,300
42-inch rope-type belt conveyor	9,000 ft	720,000
36-inch rope-type belt conveyor	30,240 ft	2,003,400
Mainline belt power center (300 kV-A)	5	93,800
Section belt power center (150 kV-A)	8	100,000
Section power center (1,000 kV-A)	12	345,000
Section rectifier (200 kW)	12	30,000
Section switch house	12	112,500
Sectionalizing switch house	10	93,800
HV cable (300 MCM AL)	13,400 ft	125,600
PLM coupler	17	16,600
Section cable and coupler	-	93,300
Rectifier for track haulage	2	50,000
Trolley wire	25,400 ft	79,400
Track (60-lb)	25,400 ft	254,000
Fresh water line	25,400 ft	95,300
Pumps and lines	-	25,000
Telephone (page phones)	-	11,300
Conveyor fire protection	-	28,800
Automatic controls and alarms	-	75,000
Scoop tractor	14	437,500
Battery charger	14	35,000
All service mask	36	4,500
Breathing apparatus	24	18,800
Self rescuer	500	18,800
Stretcher set	14	2,300
Safety light	225	9,900
Methanometer	200	75,000
Fire chemical car	8	30,000
Lamp (including accessories)	500	26,300
Dust sampler	40	15,000
Site preparation	-	37,500

TABLE B-1. - Capital investment summary, 2.06-MM-tpy mine--Continued

Item	Quantity	Total cost
Ventilation fan (dual)	-	$115,000
Concrete portal	5	87,500
Substation and distribution	1	87,500
Rock dust facility	1	24,000
Bathhouse, office, and lamp house	1	450,000
Shop and warehouse	1	240,000
Powder and cap house	1	7,000
Front-end loader	1	62,500
Forklift	1	25,000
Bulldozer	1	100,000
Utility truck	1	9,000
Pickup truck	1	6,000
Oil storage	1	18,000
Water tank	1	18,000
Supply yard	1	20,000
Mine drainage treatment plant	-	37,500
Exploration	-	130,000
Total direct		13,958,100
Field indirect		279,200
Total construction		14,237,300
Engineering		284,700
Overhead and administration		726,100
		15,248,100
Contingency		2,287,200
		17,535,300
Fee		350,700
		17,886,000
Estimated development cost		9,164,000
		27,050,000
Interest during development		1,352,500
Gross estimate		28,402,500
Credit for coal mined during development at $10 per ton		11,434,000
		16,968,500
Land acquisition at $2,500 per acre		25,087,800
Net estimate		42,056,300

TABLE B-2. - Manning table, 2.06-MM-tpy mine

Personnel	Total	Wages[1] per day	Cost per year	Cost per ton
Underground:				
Continuous miner operator...	30	$55.00	$369,160	
Loading machine operator....	30	51.98	349,228	
Machine operator helper.....	30	51.98	349,228	
Shuttle car operator........	60	49.23	662,150	
Roof bolter.................	60	55.00	738,320	
Bratticeman.................	30	47.03	316,558	
Utility man.................	30	49.23	331,078	
Mechanic (section)..........	30	55.00	369,160	
	300		3,484,882	$1.69
Supply motorman.............	6	47.58	64,037	
Beltman.....................	21	47.03	221,590	
Trackman....................	9	47.03	94,968	
Wireman.....................	9	47.03	94,968	
Mason (precision)...........	12	49.23	132,430	
Pumper......................	3	47.03	31,657	
Utility crew................	18	49.23	198,648	
Roving mechanic.............	9	55.00	110,748	
Fireboss (union)............	3	55.00	36,916	
	90		985,962	.48
Outside:				
Lampman.....................	3	45.38	30,568	
Front-end loader operator...	3	47.85	32,197	
Shop mechanic...............	9	49.50	99,858	
	15		162,623	.08
Salary:				
Superintendent..............	1	-	30,000	
General mine foreman........	1	-	20,000	
Assistant mine foreman......	3	-	48,000	
Section foreman.............	30	-	420,000	
Maintenance superintendent..	1	-	21,800	
General shop foreman........	1	-	15,200	
Mine maintenance foreman....	3	-	45,000	
Chief mine engineer.........	1	-	22,500	
Draftsman...................	1	-	9,200	
Survey crew.................	3	-	29,700	
Safety director.............	1	-	19,800	
Safety inspector............	3	-	43,500	
Dust sampler................	3	-	31,500	
Office manager..............	1	-	15,800	
Timekeeper and bookkeeper...	1	-	11,000	
Purchasing supervisor.......	1	-	15,800	
Warehouseman................	4	-	39,600	
	59		838,400	.41
Total labor and supervision...........	464		5,471,900	2.66

[1] Figures in this column are for the day shift. Shift differentials for other shifts are reflected in the cost per year.

TABLE B-3. - Depreciation schedule, 2.06-MM-tpy mine

Item	Straight-line depreciation, years	Yearly charge
Exploration	20	$6,500
Mine drainage	10	3,800
Supply yard	10	2,000
Water tank	10	1,800
Oil storage	10	1,800
Pickup truck	5	1,200
Utility truck	5	1,800
Bulldozer	10	10,000
Forklift	10	2,500
Front-end loader	10	6,300
Powder and cap house	10	700
Shop and warehouse	20	12,000
Bathhouse, office, and lamp house	20	22,500
Substation	20	4,400
Bulk rock dust facility	10	2,400
Concrete portals	20	4,400
Ventilation fan	20	5,600
Site preparation	20	1,900
Coal mine safety equipment	5	60,900
Underground equipment	10	1,217,900
Interim equipment replacement	20	232,500
Subtotal		1,602,900
Depreciation for field indirect, engineering, overhead and administration, contingency, fee, cost of development, and interest during development, less credit for coal mined at $10 per ton	20	150,500
Total		[1]1,753,400

[1] $0.85 per ton.

TABLE B-4. - Power and water cost, 2.06-MM-tpy mine

Number of units	Operation	Hp per unit	Hp, total load	Hr per day, full load	KW total load	Total kW-hr requirement
10	Continuous miner....	220	2,200	15	1,641	24,615
10	Loading machine.....	160	1,600	15	1,194	17,910
20	Shuttle car.........	100	2,000	15	1,492	22,380
10	Roof bolter.........	50	500	18	373	6,714
10	Ratio feeder........	125	1,250	15	933	14,000
10	Auxiliary fan.......	30	300	18	224	4,032
10	Mantrip Jeep........	15	150	6	112	672
5	Mechanic Jeep.......	15	75	15	56	840
6	Personnel Jeep......	7.5	45	15	34	510
10	Rock duster.........	30	300	12	224	2,688
4	Supply motor........	80	320	12	239	2,868
3	42-inch conveyor....	125	375	15	280	4,200
2	36-inch conveyor....	100	200	15	149	2,235
10	36-inch conveyor....	50	500	15	373	5,595
1	Ventilation fan.....	500	500	24	373	8,952
	Extra for pumps, tools, light, etc..		500	10	373	3,730
	Total..					121,941

NOTE. - Power: $0.02 x 121,941 x 220 = $536,600 ÷ 2,059,200
= $0.26 per ton.
Water: 3,000 gal per unit per shift at $0.10 per M gal
= 3,000 x 30 x 220 x 0.10 ÷ 1,000 = $2,000.

TABLE B-5. - Estimated annual production cost, 2.06-MM-tpy mine

	Annual cost	Cost per ton
Direct cost:		
Production:		
Labor	$4,053,700	$1.97
Supervision	756,400	.37
	4,810,100	2.34
Maintenance:		
Labor	579,800	.28
Supervision	82,000	.04
	661,800	.32
Operating supplies:		
Mining machine parts	1,297,300	.63
Lubrication and hydraulic oil	514,800	.25
Roof bolts and timber	638,400	.31
Rock dust	267,700	.13
Ventilation	391,200	.19
Bits	247,100	.12
Cables	123,600	.06
Miscellaneous	308,900	.15
	3,789,000	1.84
Power	536,600	.26
Water	2,000	
Payroll overhead (40 percent of payroll)	2,188,800	1.06
Union welfare[1]	2,165,600	1.05
Indirect cost:		
15 percent labor, supervision, and supplies	1,389,100	.67
Fixed cost:		
Taxes and insurance, 2 percent of mine cost	814,100	.40
Depreciation	1,753,400	.85
	2,567,500	1.25
Total	18,110,500	8.79

[1] Effective Dec. 6, 1974, under the Bituminous Wage Agreement of 1974.

TABLE B-6. Estimated development cost,[1] 2.06-MM-tpy mine

Item	Total cost	Cost per ton
Total labor and supervision..........	$3,559,500	$3.11
Operating supplies....................	1,292,000	1.13
Power.................................	228,700	.20
Payroll overhead......................	1,423,800	1.24
Union welfare.........................	1,189,100	1.04
Indirect cost.........................	727,700	.64
Fixed cost............................	743,200	.65
Total............................	9,164,000	8.01

[1] Estimated development cost covers the period of time required to place all units in operation within the projected mining plan.

NOTE. - Cost per ton = $8.01.
Tonnage = 1,143,400.
Credit for coal mined at $10 per ton = $11,434,000.

TABLE B-7. - Estimated working capital and total capital investment, 2.06-MM-tpy mine

Estimated working capital:	
Direct labor................................3 months...	$1,368,000
Operating supplies..........................3 months...	947,300
Payroll overhead............................3 months...	547,200
Indirect cost...............................4 months...	463,100
Fixed cost...........0.5 percent of insurance base...	203,500
Spare parts..	414,000
Miscellaneous..	55,000
Total working capital............................	3,998,100
Total estimated capital investment:	
Total mine cost (insurance, tax base)................	$40,703,800
Interest during development..........................	1,352,500
Subtotal...	42,056,300
Working capital......................................	3,998,100
Estimated capital investment.....................	46,054,400
Estimated deferred capital investment................	18,100,500
Total capital investment and deferred investment.	[1]64,154,900

[1] This is an average capital cost of $31.16 per annual ton of production.

TABLE B-8. - Summary of discounted cash flow, 2.06-MM-tpy mine

Year	Capital investment	Cash flow	Present worth factor at 15 percent	Present worth capital investment at 15 percent	Present worth cash flow value at 15 percent
-1/2	$18,421,800	$-18,421,800	1.0724	$19,755,500	$-19,755,500
0	27,632,600	-27,632,600	1.	27,632,600	-27,632,600
1	232,500	7,825,000	.8696	202,200	6,804,600
2	232,500	7,825,000	.7561	175,800	5,916,500
3	232,500	7,825,000	.6575	152,900	5,145,000
4	232,500	7,825,000	.5718	132,900	4,474,300
5	552,000	7,505,000	.4972	274,500	3,731,500
6	232,500	7,825,000	.4323	100,500	3,382,700
7	232,500	7,825,000	.3759	87,400	2,941,400
8	232,500	7,825,000	.3269	76,000	2,558,000
9	232,500	7,825,000	.2843	66,100	2,224,600
10	13,044,000	-4,986,500	.2472	3,224,500	-1,232,700
11	232,500	7,825,000	.2149	50,000	1,681,600
12	232,500	7,825,000	.1869	43,500	1,462,500
13	232,500	7,825,000	.1625	38,000	1,271,600
14	232,500	7,825,000	.1413	32,900	1,105,700
15	552,000	7,505,500	.1229	67,800	922,400
16	232,500	7,825,000	.1069	24,900	836,500
17	232,500	7,825,000	.0929	21,600	726,900
18	232,500	7,825,000	.0808	18,800	632,300
19	232,500	7,825,000	.0703	16,300	550,100
20	-28,853,400	36,910,900	.0611	-1,762,900	2,255,300
				50,431,800	2,700

TABLE B-9. - Discounted cash flow, 2.06-MM-tpy mine

15 percent - 20 years

R = \$50,431,800 ÷ 6.259[1] = \$8,057,500
less depreciation 1,753,400
Depletion + net profit = 6,304,100

Depletion = 10 percent of sales
Federal income tax = net profit
Depletion + net profit = cash flow - depreciation

Sales = 1/0.55 (1/2 operating cost + cash flow - depreciation)
= 1/0.55 (9,055,300 + 6,304,100)

Sales..................	\$27,926,200
Operating cost........	18,110,500
Gross profit..........	9,815,700
Depletion.............	2,792,600
Taxable income........	7,023,100
Federal income tax....	3,511,600
Net profit............	3,511,600

Annual cash flow = net profit + depreciation + depletion
= \$3,511,600 + \$1,753,400 + \$2,792,600
= \$8,057,600

Selling price per ton = \$27,926,200 ÷ 2,059,200 = \$13.56

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[1] Uniform series present worth factor.

APPENDIX C.--3.09-MM-tpy mine

TABLE C-1. - Capital investment summary, 3.09-MM-tpy mine

Item	Quantity	Total cost
Continuous miner	18	$3,668,400
Loading machine	18	1,418,400
Shuttle car	36	2,205,000
Roof bolter	20	1,100,000
Ratio feeder	18	810,000
Auxiliary fan	20	75,000
Mantrip Jeep	15	262,500
Mechanic Jeep	6	82,600
Personnel Jeep	10	125,000
Trickle rock duster	20	87,600
Triple duty rock duster	20	775,000
Supply motor	7	218,800
Supply car	75	234,500
42-inch rope-type belt conveyor	9,000 ft	720,000
36-inch rope-type belt conveyor	48,000 ft	3,180,000
Mainline belt power center (300 kV-A)	6	112,600
Section belt power center (150 kV-A)	12	150,000
Section power center (1,000 kV-A)	18	517,500
Section rectifier (200 kW)	18	45,000
Section switch house	18	168,800
Sectionalizing switch house	12	112,600
HV cable (300 MCM AL)	18,500 ft	173,400
PLM coupler	19	18,600
Section cable and coupler	-	125,000
Rectifier for track haulage	3	75,000
Trolley wire	42,500 ft	132,900
Track	42,500 ft	425,000
Fresh water line	42,500 ft	159,500
Pumps and lines	-	37,500
Telephone (page phones)	-	15,000
Conveyor fire protection	-	37,500
Automatic controls and alarms	-	93,800
Scoop tractor	20	625,000
Battery charger	20	50,000
All service mask	36	4,500
Breathing apparatus	36	28,200
Self rescuer	700	26,300
Stretcher set	25	4,100
Safety light	300	13,200
Methanometer	300	112,500
Fire chemical car	10	37,500
Lamp (including accessories)	700	36,800
Dust sampler	50	18,800
Site preparation	-	50,000
Ventilation fan (dual)	-	115,000

TABLE C-1. - Capital investment summary, 3.09-MM-tpy mine--Continued

Item	Quantity	Total cost
Concrete portal	5	$87,500
Substation and distribution	1	93,800
Rock dust facility	1	37,500
Bathhouse, office, and lamp house	1	500,000
Shop and warehouse	1	312,500
Powder and cap house	1	8,800
Front-end loader	1	62,500
Forklift	1	25,000
Bulldozer	1	100,000
Utility truck	1	9,000
Pickup truck	1	6,000
Oil storage	1	25,000
Water tank	1	25,000
Supply yard	1	20,000
Mine drainage treatment plant	-	37,500
Exploration	-	187,500
Total direct		20,022,000
Field indirect		400,400
Total construction		20,422,400
Engineering		408,400
Overhead and administration		1,041,500
		21,872,300
Contingency		3,280,800
		25,153,100
Fee		503,100
		25,656,200
Estimated development cost		13,639,100
		39,295,300
Interest during development		1,964,800
		41,260,100
Credit for coal mined during development at $10 per ton		17,590,000
		23,670,100
Land acquisition at $2,500 per acre		37,632,800
Net estimate		61,302,900

TABLE C-2. - Manning table, 3.09-MM-tpy mine

Personnel	Total	Wages[1] per day	Cost per year	Cost per ton
Underground:				
Continuous miner operator...	45	$55.00	$553,740	
Loading machine operator....	45	51.98	523,842	
Machine operator helper.....	45	51.98	523,842	
Shuttle car operator........	90	49.23	993,234	
Roof bolter.................	90	55.00	1,107,480	
Bratticeman.................	45	47.03	474,757	
Utility man.................	45	49.23	496,617	
Mechanic (section)..........	45	55.00	553,740	
	450		5,227,300	$1.70
Supply motorman.............	9	47.58	96,057	
Beltman.....................	30	47.03	316,558	
Trackman....................	15	47.03	158,279	
Wireman.....................	15	47.03	158,279	
Mason (precision)...........	15	49.23	165,539	
Pumper......................	3	47.03	31,652	
Utility crew................	30	49.23	331,078	
Roving mechanic.............	15	55.00	184,580	
Fireboss (union)............	3	55.00	36,916	
	135		1,478,938	.47
Outside:				
Lampman.....................	3	45.38	30,568	
Front-end loader operator...	3	47.85	32,197	
Shop mechanic...............	12	55.00	147,664	
	18		210,429	.07
Salary:				
Superintendent..............	1	-	30,000	
General mine foreman........	1	-	20,000	
Assistant mine foreman......	3	-	48,000	
Section foreman.............	45	-	630,000	
Maintenance superintendent..	1	-	21,800	
General shop foreman........	1	-	15,200	
Mine maintenance foreman....	3	-	45,000	
Chief mine engineer.........	1	-	22,500	
Draftsman...................	1	-	9,200	
Survey crew.................	3	-	29,700	
Safety director.............	1	-	19,800	
Safety inspector............	3	-	43,500	
Dust sampler................	3	-	31,500	
Office manager..............	1	-	15,800	
Timekeeper and bookkeeper...	1	-	11,000	
Purchasing supervisor.......	1	-	15,800	
Warehouseman................	4	-	39,600	
	74		1,048,400	.34
Total labor and supervision..........	677		7,965,100	2.58

[1] Figures in this column are for the day shift. Shift differentials for other shifts are reflected in the cost per year.

TABLE C-3. - Depreciation schedule, 3.09-MM-tpy mine

Item	Straight-line depreciation, years	Yearly charge
Exploration........................	20	$9,400
Mine drainage treatment plant......	10	3,800
Supply yard........................	10	2,000
Water tank.........................	10	2,500
Oil storage........................	10	2,500
Pickup truck.......................	5	1,200
Utility truck......................	5	1,800
Bulldozer..........................	10	10,000
Forklift...........................	10	2,500
Front-end loader...................	10	6,300
Powder and cap house...............	10	900
Shop and warehouse.................	20	15,600
Bathhouse, office, and lamp house..	20	25,000
Substation.........................	20	4,700
Bulk rock dust facility............	10	3,800
Concrete portals...................	20	4,400
Ventilation fan....................	20	5,800
Site preparation...................	20	2,500
Coal mine safety equipment.........	5	82,600
Underground equipment..............	10	1,790,000
Interim equipment replacement......	20	314,200
Subtotal.......................		2,291,500
Depreciation for field indirect, engineering, overhead and administration, contingency, fee, cost of development, and interest during development, less credit for coal mined at $10 per ton......................	20	182,400
Total......................		[1]2,473,900

[1] $0.80 per ton.

TABLE C-4. - Power and water cost, 3.09-MM-tpy mine

Number of units	Operation	Hp per unit	Hp, total load	Hr per day, full load	KW, total load	Total kW-hr requirement
15	Continuous miner.....	220	3,300	15	2,462	36,930
15	Loading machine......	160	2,400	15	1,790	26,850
30	Shuttle car..........	100	3,000	15	2,238	33,570
15	Roof bolter..........	50	750	18	560	10,080
15	Ratio feeder.........	125	1,875	15	1,399	20,985
15	Auxiliary fan........	30	450	18	336	6,048
15	Mantrip Jeep.........	15	225	6	168	1,008
6	Mechanic Jeep........	15	90	15	67	1,005
10	Personnel Jeep.......	7.5	75	15	56	840
7	Supply motor.........	80	560	12	418	5,016
30	Rock duster..........	30	900	12	671	8,052
3	42-inch conveyor.....	200	600	15	448	6,720
3	36-inch conveyor.....	100	300	15	224	3,360
12	36-inch conveyor.....	50	600	15	448	6,720
1	Ventilation fan......	500	500	24	373	8,952
	Extra for pumps, tools, lights, etc.		500	10	373	3,730
	Total..					179,866

NOTE. - Power: $0.02 x 179,866 x 220 = $791,400 ÷ 3,088,800
= $0.26 per ton.

Water: 3,000 gal per unit per shift at $0.10 per M gal
= 3,000 x 45 x 220 x 0.10 ÷ 1,000 = $3,000.

TABLE C-5. - Estimated annual production cost, 3.09-MM-tpy mine

	Annual cost	Cost per ton
Direct cost:		
Production:		
Labor	$6,030,700	$1.95
Supervision	966,400	.31
	6,997,100	2.26
Maintenance:		
Labor	886,000	.29
Supervision	82,000	.03
	968,000	.32
Operating supplies:		
Mining machine parts	1,945,900	.63
Lubrication and hydraulic oil	772,200	.25
Rock bolts and timber	957,500	.31
Rock dust	401,500	.13
Ventilation	586,900	.19
Bits	370,700	.12
Cables	185,300	.06
Miscellaneous	463,300	.15
	5,683,300	1.84
Power	791,400	.26
Water	3,000	
Payroll overhead (40 percent of payroll)	3,186,000	1.03
Union welfare[1]	3,240,900	1.05
Indirect cost:		
15 percent labor, supervision, and supplies	2,047,300	.67
Fixed cost:		
Taxes and insurance, 2 percent of mine cost	1,186,800	.38
Depreciation	2,473,900	.80
	3,660,700	1.18
Total	26,577,700	8.61

[1] Effective Dec. 6, 1974, under the Bituminous Wage Agreement of 1974.

TABLE C-6. - Estimated development cost,[1] 3.09-MM-tpy mine

Item	Total cost	Cost per ton
Total labor and supervision..........	$5,187,600	$2.95
Operating supplies...................	1,820,600	1.04
Power................................	351,800	.20
Payroll overhead.....................	2,075,000	1.18
Union welfare........................	1,829,400	1.04
Indirect cost........................	1,231,300	.70
Fixed cost...........................	1,143,400	.65
Total...........................	13,639,100	7.76

[1] Estimated development cost covers the period of time required to place all units in operation within the projected mining plan.

NOTE. - Cost per ton = $7.75.
Tonnage = 1,759,000.
Credit for coal mined at $10 per ton = $17,590,000.

TABLE C-7. - Estimated working capital and total capital investment, 3.09-MM-tpy mine

Estimated working capital:		
Direct labor.............................	3 months...	$1,991,300
Operating supplies.......................	3 months...	1,420,800
Payroll overhead.........................	3 months...	796,500
Indirect cost............................	4 months...	682,600
Fixed cost...........	0.5 percent of insurance base...	296,700
Spare parts..		600,000
Miscellaneous..		82,500
		5,870,400
Total estimated capital investment:		
Total mine cost (insurance, tax base)................		$59,338,100
Interest during development..........................		1,964,800
Subtotal..		61,302,900
Working capital......................................		5,870,400
Estimated capital investment.......................		67,173,300
Estimated deferred capital investment................		25,811,000
Total capital investment and deferred investment.		[1]92,984,300

[1] This is an average capital cost of $30.10 per annual ton of production.

TABLE C-8. - Summary of discounted cash flow, 3.09-MM-tpy mine

Year	Capital investment	Cash flow	Present worth factor at 15 percent	Present worth capital investment at 15 percent	Present worth cash flow value at 15 percent
-1/2	$26,869,300	$-26,869,300	1.0724	$28,814,600	$-28,814,600
0	40,304,000	-40,304,000	1.	40,304,000	-40,304,000
1	314,200	11,398,200	.8696	273,200	9,911,900
2	314,200	11,398,200	.7561	237,600	8,618,200
3	314,200	11,398,200	.6575	206,600	7,494,300
4	314,200	11,398,200	.5718	179,700	6,517,500
5	742,200	10,970,200	.4972	369,000	5,454,400
6	314,200	11,398,200	.4323	135,800	4,927,400
7	314,200	11,398,200	.3759	118,100	4,284,600
8	314,200	11,398,200	.3269	102,700	3,726,100
9	314,200	11,398,200	.2843	89,300	3,240,500
10	18,985,200	-7,272,800	.2472	4,693,100	-1,797,800
11	314,200	11,398,200	.2149	67,500	2,449,500
12	314,200	11,398,200	.1869	58,700	2,130,300
13	314,200	11,398,200	.1625	51,100	1,852,200
14	314,200	11,398,200	.1413	44,400	1,610,600
15	742,200	10,970,200	.1229	91,200	1,348,200
16	314,200	11,398,200	.1069	33,600	1,218,500
17	314,200	11,398,200	.0929	29,200	1,058,900
18	314,200	11,398,200	.0808	25,400	921,000
19	314,200	11,398,200	.0703	22,100	801,300
20	-43,189,000	54,901,400	.0611	-2,638,800	3,354,500
				73,308,100	3,500

TABLE C-9. - Discounted cash flow, 3.09-MM-tpy mine

15 percent - 20 years

R = $73,308,100 ÷ 6.259[1] = $11,712,400
less depreciation 2,473,900
Depletion + net profit = 9,238,500

Depletion = 10 percent of sales
Federal income tax = net profit
Depletion + net profit = cash flow - depreciation

Sales = 1/0.55 (1/2 operating cost + cash flow - depreciation)
= 1/0.55 (13,288,900 + 9,238,500)

Sales..................	$40,958,900
Operating cost.........	26,577,700
Gross profit...........	14,381,200
Depletion..............	4,095,900
Taxable income.........	10,285,300
Federal income tax.....	5,142,700
Net profit.............	5,142,700

Annual cash flow = net profit + depreciation + depletion
= $5,142,700 + $2,473,900 + $4,095,900
= $11,712,500

Selling price per ton = $40,958,900 ÷ 3,088,800 = $13.26

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[1] Uniform series present worth factor.

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Long-Distance Coal Transport: Unit Trains or Slurry Pipelines

UNITED STATES DEPARTMENT OF THE INTERIOR

U.S Bureau of Mines.

Information Circular 8690

Long-Distance Coal Transport: Unit Trains or Slurry Pipelines

By T. C. Campbell and Sidney Katell
Process Evaluation Group–MMRD, Morgantown, W. Va.

March 3, 1849

UNITED STATES DEPARTMENT OF THE INTERIOR
Kent Frizzell, Acting Secretary

Jack W. Carlson, Assistant Secretary–Energy and Minerals

BUREAU OF MINES
Thomas V. Falkie, Director

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1975

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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LONG-DISTANCE COAL TRANSPORT: UNIT TRAINS OR SLURRY PIPELINES

by

T. C. Campbell[1] and Sidney Katell[2]

ABSTRACT

This Bureau of Mines publication presents an analysis of information related to the transportation of bituminous coal by unit trains and slurry pipelines. Even for short hauls from mines to markets, transport costs frequently account for between one-third and one-half of the delivered price of coal. Minimizing these costs has become an even more critical objective for hauls from the western mines than for hauls from farther east.

Factors related to minimizing costs and transporting the western coal receive special attention. Although no general rule of preference is likely to be developed that can be applied to all shipments, both rail and pipeline service will be needed on an increasing scale. The study should provide useful background information and analysis for government and industry in approaching investment decisions in the mining and transportation industries.

INTRODUCTION

Interest in western coal, intensified by the energy crisis, has caused a corresponding interest in transporting the coal to markets, particularly those in the Midwest and possibly as far as the east coast. This coal is much farther from the major consuming markets than is that from the Appalachian and Midwest mines. For example, the Burlington Northern loads four unit trains each week at the Big Sky mine of the Peabody Coal Company near Colstrip, Mont. These 10,000-ton trainloads are delivered to a power station at Cohasset, Minn., 940 miles from the mine in Montana (9).[3] Coal moves on a regularly scheduled basis from Montana, Wyoming, and other Western States to destinations of 1,000 to 1,200 miles away.

These shipments are quite different from those originating in the Appalachian and Illinois mines. From these fields the average haul has been less than 300 miles, with few specific hauls exceeding 500 miles. From

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[1] Economist.

[2] Chief.

[3] Underlined numbers in parentheses refer to items in the list of references at the end of this report.

Pittsburgh, Pa., to Lorain, Ohio, the distance is about 200 miles. The average haul to the same general destination from the New River and Pocohantas fields in southern West Virginia is approximately 440 miles. From the Kanawha and Kenova-Thacher districts, also in southern West Virginia, the average haul is slightly more than 500 miles; but from the Fairmont district in northern West Virginia to Cleveland it is about 250 miles (15). Table 1 shows rail-line distances between selected points near coalfields and actual or potential markets.

TABLE 1. - Railroad short-line distances between selected cities

Coalfield and market		Rail-line distance, miles
Billings, Mont., to	Chicago, Ill.	1,278
	St. Louis, Mo.	1,310
	St. Paul, Minn.	882
	Seattle, Wash.	903
Cheyenne, Wyo., to	Chicago, Ill.	995
	St. Louis, Mo.	921
	New Orleans, La.	1,447
	San Francisco, Calif.	1,268
Denver, Colo., to	Chicago, Ill.	1,026
	St. Louis, Mo.	914
	Memphis, Tenn.	1,120
	Los Angeles, Calif.	1,353
Pittsburgh, Pa., to	Chicago, Ill.	468
	St. Louis, Mo	611
	New York, N. Y.	439
	Cleveland, Ohio	131
Charleston, W. Va., to	Chicago, Ill.	498
	Toledo, Ohio	339
	Hampton Roads, Va.	444
Clarksburg, W. Va., to	Baltimore, Md.	288
	Cleveland, Ohio	232
	Pittsburgh, Pa.	166
Centralia, Ill., to	St. Louis, Mo.	62
	Chicago, Ill.	255

Source: Rand McNally Handy Railroad Atlas of the United States, 1973, p. 64.

Actually only a small amount of coal moves between some of the points included in table 1, such as from Billings to Seattle or from Cheyenne to New Orleans. But such movements are being considered and are only slightly longer than some of the hauls that are becoming more numerous. For example, Minnesota received 57 percent of coal they consumed in 1973 from Western States, and Illinois, 15 percent (64). With rapidly increasing production in Montana and Wyoming, these percentages could easily become much higher. Table 2 indicates the magnitude of the growth in coal and lignite production in these States. Even though the production figures for 1967 are low compared with those for Kentucky, West Virginia, and Illinois, the rates of growth are, nevertheless, high.

TABLE 2. - Production of bituminous coal and lignite in Montana and Wyoming, 1967-74

Year	Thousand net tons	
	Montana	Wyoming
1967	371	3,588
1968	519	3,829
1969	1,030	4,602
1970	3,447	7,222
1971	7,064	8,052
1972	8,221	10,928
1973	10,725	14,886
1974	14,106	20,703

Source: U.S. Bureau of Mines. Minerals Yearbooks, 1967-74.

Coping with increasingly large tonnages of western coal poses problems different from those encountered with the much shorter hauls from the eastern fields. Unit trains were certain to move much of this traffic. But other means of transportation naturally were seriously considered, especially slurry pipelines because of experiences with the Ohio and Black Mesa pipelines.

The earliest recorded use of a solids pipeline was a part of a placer mining operation in California in the late 1850's. A patent was granted in 1891 to convey solid material in an artificial or natural condition in liquid form through "pipes by gravity or force pumps." An application was submitted in 1904 for a patent related to "transporting solids, particularly coal." Before 1900, a patent was granted in England on "a method of pneumatic transport of solids." References to early installations of solids lines in New Zealand, Nigeria, and Swaziland also have been found.

Proposals were presented in Pennsylvania in 1921 for two solids pipelines--one for anthracite and the other for bituminous coal. In the 1930's, coal companies pumped fine refuse to silt banks and phosphate was pumped from open pit mines in Florida to washeries. Lime was moved in Columbia in the 1940's to a mill over a distance of 10 miles. After World War II, a 15-inch line about 6 miles long was installed in France to pump sludge from a coal-washing plant to a power station to be dried and burned in a boiler. In Canada, lines were built in the early 1950's to transport nickel-copper concentrates. A short time later, Canadians investigated the feasibility of "transporting wheat from prairie provinces to the Great Lakes." In 1957, the U.S.S.R. was reported to have "the first long distance coal pipeline" (22), one 38 miles long and 12 inches in diameter.

In more recent years, mixtures of solids and liquids were moved successfully for short distances inside plants and for longer distances up to several hundred miles. Lines exceeding 1,000 miles in length are under active consideration. Available technology assures high probability of success for slurry pipeline transport of a rather wide range of commodities.

WESTERN COAL

Historically, U.S. coal has experienced serious transportation problems, principally because of its solid state and low value relative to its weight. In the early days transporting and mining operations of coal were quite simple Coal was hauled in horsedrawn wagons and carts and on flat boats of various sizes and sold by the bushel to the early settlers. Tramroads and tramways also preceded the railroad. The following question inevitably arises: Why must coal be hauled 1,000 miles when large reserves exist within 200 to 400 miles of most cities in the Midwest and East? Figure 1 gives a rough approximation of the distances from the western fields to different markets. The Appalachian and Illinois fields have substantial deposits that would last hundreds of years even with increasing production rates.

The chief reason for the great interest in coal from the Western States is its low-sulfur content as compared with coal from Eastern States. The environmental requirements imposed upon the electric generating stations caused a large shift to oil away from coal, which is far more abundant than is

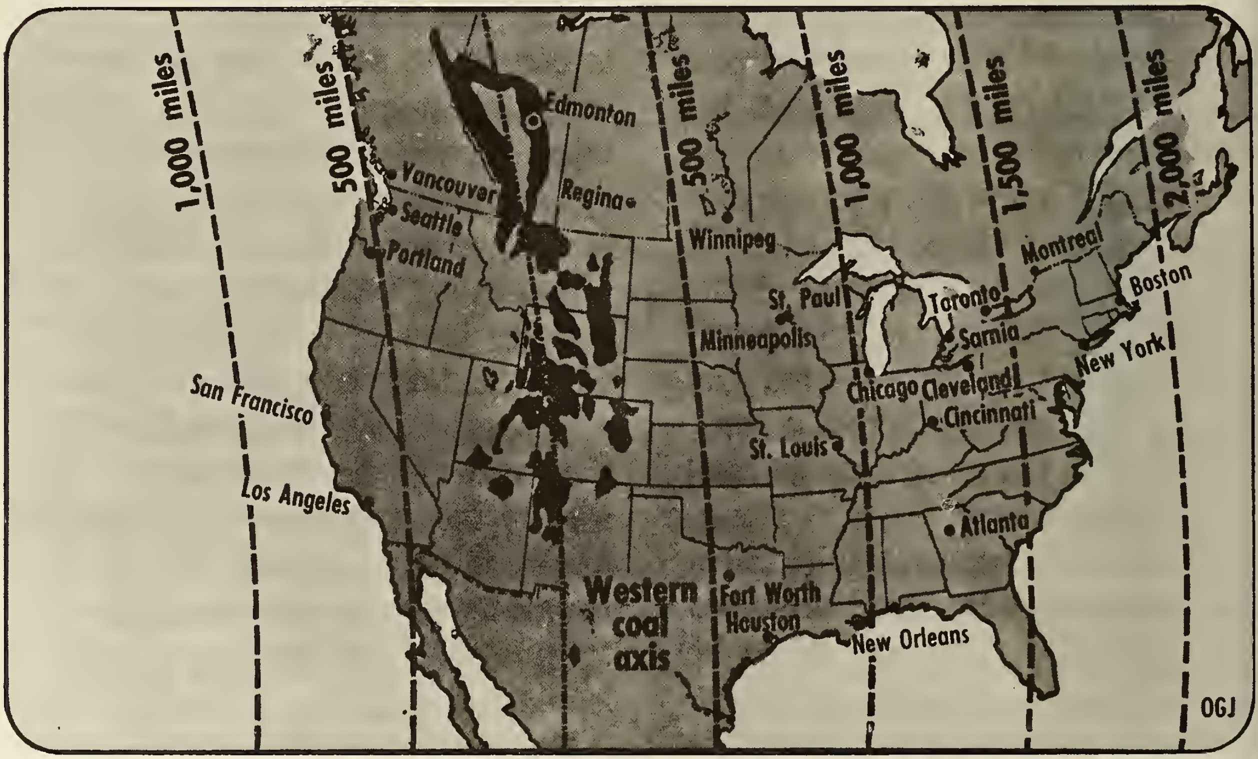

FIGURE 1. - Western coal distance to major markets. *(Courtesy, Oil and Gas J., Dec. 24, 1973, p. 44.)*

oil. Since the oil shortages were so critical late in 1973, interest in western coal increased much more than at any time in the past.

The energy output of eastern coal is, however, considerably above that of western fields. The heating value of western coal averages about 9,000 Btu per pound compared with about 12,000 Btu for eastern coal (11). The low heating value of western coal as well as greater distances from the West, greatly favors sales from the eastern mines. In fact, as late as 1973, little more than 5 percent of the 600 million tons produced in the United States was mined in the West (74).

But along with the low-sulfur content, western coal has other important features. The seams lie just below the surface and some are as much as 100 ft thick. An example is the Powder River Basin in Wyoming, considered one of the greatest production areas, where seam thickness ranges from 25 to 100 ft, averaging about 55 ft. The overburden of sedimentary rock and clay is from 25 to 200 ft. The basin extends along the eastern Wyoming border through several counties and into Montana (9).

The cost of mining western coal is much less per ton than in the Appalachian fields. A 1973 Business Week account estimated that coal "can be strip-mined in the West for $3 to $5 a ton, compared with $9 to $14 in the eastern mines" (9). The greater output per man-day in several coal-producing States is shown in table 3. Relatively low mining costs and high output per man-day are among the most significant factors that permit western coal to reach markets long distances away. Also, because of both the sizable production of the mines and consumption of coal by the powerplants, the volumes of traffic are large. All of these are factors favorable to both slurry pipeline and unit train operations.

TABLE 3. - Output per man-day at bituminous coal mines in the United States and selected States

	Tons per man-day		
	1968	1971	1973
United States................	19.37	18.02	17.58
Kentucky.....................	22.41	22.05	21.29
Ohio.........................	25.38	24.03	21.26
Pennsylvania.................	15.43	13.54	12.52
West Virginia................	15.77	12.63	11.83
Illinois.....................	29.67	24.42	23.56
Indiana......................	38.08	34.87	35.98
Colorado.....................	18.20	17.63	17.46
Montana......................	50.33	133.98	127.11
Utah.........................	16.68	14.02	14.36
Wyoming......................	50.55	50.81	55.94

Source: U.S. Bureau of Mines. Minerals Yearbooks, 1968, 1971, 1973.

THE OHIO PIPELINE

Research and development of a system to move coal through a pipeline was begun in 1950 by Consolidation Coal Company. An unpublished paper distributed by the Office of the Governor of West Virginia in January 1962 noted that a "12-inch-diameter trial pipe loop was installed in 1952 to demonstrate the capacity to transport through pipelines a mixture of finely ground coal and water." The mixture, or slurry, was to have a "composition of 50 percent coal and 50 percent water by weight."

The same paper stated that a contract was negotiated in 1957 with the Cleveland Electric Illuminating Company to deliver 1.2 million tons of coal to its Eastlake Station. A 10-inch pipeline was constructed from Cadiz, Ohio, a point near the Ohio River, to Eastlake, a distance of 108 miles. By the end of 1961, nearly 5 million tons of coal had moved through the line. Its success caused much interest in other possible pipelines, particularly an interstate line from northern West Virginia to powerplants near and along the east coast.

In 1962 the West Virginia Legislature passed a law granting "the right of eminent domain for transportation of coal by pipeline" (72). This was about the time President Kennedy announced his support for legislation in the Congress to permit construction of an interstate line. Senator Warren Magnuson, Chairman of the Senate Committee on Interstate and Foreign Commerce, submitted a bill "to give the coal pipelines the right to condemn land for rights of way" (17).

Senator Magnuson's bill dealt with a very serious legal question that could be resolved only by Congress and which has not yet been resolved. No pipeline could stretch very far east from West Virginia coalfields without going over or under railroad tracks. Several of the railroads indicated that they were not willing "to permit coal pipelines to pass beneath their tracks, though they grant such permits as a matter of course to pipelines carrying other forms of energy" (46).

To complicate the matter further, a determination of whether a coal pipeline is a private or a common carrier has not been made at the Federal level. The right of eminent domain is, by tradition, for common, not private carriers Mr. George H. Love, Chairman of the Consolidation Coal Company Board, stated that the industry was not seeking "the right of eminent domain for a purely private pipeline." He described the proposed line as "simply another form of transportation and as such it should and must be capable of serving all producers--both small and large--who can utilize its facilities, and it should and must treat all users alike under rates and terms that are subject to regulation by the appropriate government agency" (47). This statement was circulated by the National Coal Association and indicated that industry leaders expected coal slurry lines to be common carriers subject to public regulation similar to those that apply to railroads and petroleum pipelines, both of which are regulated by the Interstate Commerce Commission.

Mr. Love referred to coal slurry as a "new fuel" that could be "transported and handled in the same manner as a fuel oil." In response to railroad opposition, he invited the railroads to "compete by reduced rates" and added that "before any pipeline is built, the railroads will have an opportunity to demonstrate whether the use of their services is more desirable and more economic" (47).

In the public debate over the issue, Texas Eastern Transmission Corporation and Consolidation Coal Company distributed a pamphlet calling attention to the fact that several railroads also had direct interests in pipelines. Among them was the Southern Pacific's petroleum product pipeline from El Paso to Los Angeles. The Santa Fe was constructing a pipeline from San Diego to Los Angeles, and the Great Northern, one from North Dakota to Minnesota and Wisconsin. Also noted was the announced plan of the Pennsylvania Railroad to have a petroleum pipeline from "the port of Baltimore to Dulles International Airport" (62).

In any event, the bill did not receive congressional approval and construction of the interstate pipeline did not start. However, this effort and the operating success of the Ohio slurry line focused much public attention on coal transportation costs. A new transport mode would have been possible, if only the legal hurdles could have been removed.

This was also about the same time that railroads were experimenting with volume freight rates that have since become established as multiple car, trainload, and unit-train rates. This was aptly stated by Forbes magazine in 1961 (25):

> Just when things were starting to look up for the hard-pressed eastern railroads, they received an only slightly disguised ultimatum from their best customers: Cut rates or lose coal traffic.

The rates were reduced. The lower rates filed by the Baltimore and Ohio are an early example to "apply to a full trainload of 4,500 or 9,000 net" to be transported as a "unit to one public utility customer at one destination" (73). Other rate reductions followed and in 1963 the Cadiz to Eastlake pipeline was "shut down" and placed on a "standby basis" (49).

THE BLACK MESA PIPELINE

The next long-distance slurry line was the 273-mile Black Mesa coal pipeline, which was placed in operation in August 1970 and which became the "largest and longest slurry pipeline in the world" (8). This is an 18-inch line, compared with the 10-inch, 108-mile Ohio line, and extends from the Black Mesa coal mine in Arizona to the Mohave electrical power generating plant on the Colorado River near Bullhead City, Nev. The line is owned and operated by a subsidiary of the Southern Pacific Transportation Company.

The Black Mesa line had the advantage of the operating experience of the Ohio line; but unlike that line, it is "the only link between the coal source and the delivery point" and was not constructed to be a competitor to existin railroads. The Black Mesa coalfields are more than 100 miles from the neares railhead. Had additional tracks been constructed to move the coal by unit trains, the distance by rail would have been 45 percent greater than by the pipeline. Even though the lower freight rates on coal led to the retirement of the Ohio line, "the technology that provided for its successful and sustained 6-year operation provided the basis for the design and operation of th Black Mesa pipeline" (19, 26).

There seems to be little question that operation of the Ohio pipeline wa successful, proving that the venture was technologically sound. During the very early stages of its operation, there were reports that the line clogged or jammed on its first run in February 1957 (45, 55), but on the whole the operation was quite successful. Furthermore, other slurry lines had moved other products, providing additional proof that the Black Mesa line would be successful. This line moves about 5 million tons each year to the powerplant The conclusion seems to be justified that despite the fact that "western coal are about 800 to 1,500 miles from major midwestern markets, all of these markets are within economic reach of slurry pipeline movement from the wester coalfields" (76).

THE ADVENT OF VOLUME FREIGHT RATES

A group of railroads engaged the Kauffield Engineering Company in 1961 to "analyze the problems associated with the energy transportation market." This firm's report suggested a "plan known as the integral coal train" (30). This report concluded that the minimum payload for a single one-commodity typ train appeared to be "about 25,000 tons...a train about 2-1/2-miles long." I also referred to speeds of "50 to 55 miles per hour" and that it was "practicable to load 25,000 to 30,000 tons of coal in 8 hours with one employee" (69).

The basic unit for quoting railroad freight rates had long been the carload. As noted in a 1962 study, "the same basic rate is available to any shipper whether that shipper uses the rate once each year on a single car or whether he uses the rate of a steady movement of 100 cars per day from a single origin to a single destination" (68).

Without doubt, the reluctance of the Interstate Commerce Commission to permit multiple carload, trainload, or other types of rates based on large volume shipments proved to be a definite deterrent to earlier developments of special single-commodity trainload service. A reaction, quite typical of the thinking frequently expressed, appeared in the Wall Street Journal in May 1964 and read as follows: "To be up to snuff on railroad rates these days, all one needs are the listings of the various tariffs and a library the size of New York's Grand Central Station to hold them" (23).

Carload rates, lower than charges for smaller, less-than-carload shipments, were approved as early as 1890, in spite of the contention that they favored large shippers to the disadvantage of small shippers (40). This very genuine concern that small shippers not be penalized merely because they are small has been an important factor in rail freight rates throughout the history of public regulation in this country. The prevailing view has long been that arrangements granting lower rates for a "large volume of freight during the year, or other period of time, is ordinarily considered an unjust discrimination against small shippers." The Commission, in one of its earliest decisions, condemned the "practice of allowing a discount in the rate of coal to consignees who received not less than 30,000 tons of coal within a year" (37, 44, 63).

The departure from the practice of virtually absolute prohibition of rates lower than those based on the carload occurred about 1959. In fact, that is the year the Pocahontas railroads proposed a new rate of 35 cents per ton below the regular rate on coal moving to an electric powerplant that was to receive 1.5 million tons during a 12-month period (39). In the following year, another case before the Interstate Commerce Commission permitted lower volume rates on coal destined for the New York Harbor area originating from mines in Pennsylvania, Virginia, West Virginia, and Kentucky (34). The coal from these Appalachian fields constituted quite a large movement of approximately 60 million tons per year "to electric utility plants located within a narrow strip of territory along the coastal fringe of the Atlantic seaboard." The new rate schedules did not "specifically designate the affected utility plants," and they were "nominally available to all receivers" who could meet such volume requirements. It was clearly stated that the lower rates were designed "to meet oil competition" and were applicable only to the "specific area where electric plants are located" (34). Oil consumed in the electric powerplants in competition with the Appalachian coal was transported abroad or up the Atlantic coast by tankers not subject to Interstate Commerce Commission regulations.

OTHER PRESSURES FOR RATE STRUCTURE MODIFICATIONS

Several other developments having distinct impacts on unit train and other large-volume shipments occurred at about the same time. Since these developments are all interrelated, no single one can be designated as the most important one. The Interstate Commerce Commission did seem to find a distinct difference between competition for (1) an unregulated or imported commodity such as oil and (2) coal moving from different fields and competing in a major market with oil (33). Business Week magazine noted as late as November 1966 that "a railroad cannot apply for a reduced rate based on bigger movements without bringing on a storm of protests from large barge operators and sometimes even from other railroads" (14). This represented a prevailing view, even though volume rates had actually been published before 1966 on certain specified shipments of bituminous coal, molasses, grain, and possibly a few other bulk commodities.

The Ohio slurry pipeline had operated long enough to prove its effectiveness in transporting large quantities of coal at costs lower than those charged by the railroads. Construction of an interstate slurry pipeline from northern West Virginia to eastern utility plants has not been authorized by Congress but such a pipeline may still be constructed.

Another important development that represented a significant pattern of thinking among national leaders was expressed in the report by the Presidential Advisory Committee on Transportation Policy and Organization in 1956 (67). The Committee had been appointed by President Eisenhower in 1954 with Secretary of Commerce Sinclair Weeks as Chairman. A major thrust of the report was to allow railroad management greater freedom in determining specific rates, with Commission control limited to approval of reasonable maximum and minimum rates. Bulk commodities moving over inland coastal waterways were never subject to public regulation, and private motor carriers were not regulated. However, contract motor carriers were subject to less control than were common carrier trucks.

Following the submission of the 1956 policy report, the Transportation Act of 1958 with the modification of Section 15(a) of the Interstate Commerce Act was passed. A sentence added to the section stating that "rates of a carrier shall not be held up to a particular level to protect the traffic of any other mode of transportation, giving due consideration to the objectives of the national transportation policy declared in the act" (16).

Much confusion occurred over what the 1958 law actually meant soon after it was enacted. The Commission was alleged to have followed a policy commonly known as the "umbrella principle" of refusing to allow rate reductions requested by the railroads when, in the opinion of the Commission, the lower rates would have a serious adverse effect on traffic moving by competing motor and water carriers. The Commission never admitted that it followed such a principle, but railroad spokesmen were absolutely certain that it did exist and noted specific Commission decisions to substantiate their view (79).

Pointing out that rates are not to be held up to "protect the traffic of another mode of transportation" seemed clear enough had that been the end of the sentence. But to add the additional phrase, "giving due consideration of the objectives of the national transportation policy" confused the issue as much as the others had clarified it. Several cases before the Commission soon followed, some going on to the U.S. Supreme Court. The overall result is well summarized in a 1959 decision that "a carrier is not required to maintain rates on an artificially high level to protect the traffic of another mode of transportation" (31, 39). Railway Age in 1963 pointed out that the U.S. Supreme Court in its first interpretation of the rate freedom provision of the Act specified that "primary attention must be given to the prohibition against holding a carrier's rates up to a particular level to protect the traffic of another mode of transport" (56).

From about 1963 to 1965 the legal framework under which trainload and other volume rates could be enacted was quite firmly established. The series of Commission and Court decisions related to the so-called "Big-John" case had been completed. Southern Railway had acquired more than 500 aluminum hopper cars, each with capacity exceeding 100 tons. Rates for grain moving in these cars was "about 40 percent of the previous level." Transit privileges and absorption of switching charges were not permitted, and special demurrage charges were instituted to discourage retention of the cars at destination points. The cars were used primarily to move grain to southern markets and for export (31). Barge lines protested the lower rates, but the principle of lower rates for these large-volume shipments under rigid, specific conditions was approved in 1965 (2). Rates below those in effect on carload shipments were an absolute necessity to provide a basis on which to develop trainload and other large-volume coal shipments.

THE FIRST UNIT TRAINS

The Southern Railway seems to have been given credit for having inaugurated the first unit train in 1960, with two trains hauling coal to an electric powerplant in Alabama (60). Within a short period of time, similar arrangements were made with several railroads, especially with those carrying large coal shipments, and by mid-1965 the Association of American Railroads reported that "in the previous two years some 25 railroads estimated they hauled 20 percent of all coal in solid trainloads" (30).

There are slightly different definitions of a unit train, but the differences are not great. In a strict sense, the unit train is a complete train of dedicated cars "operating on a regularly scheduled cycle movement between a single origin and a single destination" (30). This, however, does not mean that every trainload must originate from the same point or proceed to the same destination. For example, a unit train comprised of 100 cars, each loaded with 100 tons of coal, can move from a mine to an electric powerplant to be unloaded and then returned to the mine. As the train is reloaded, it can proceed to another plant with its 10,000-ton load.

The 100-ton cars have become something of a standard for new cars designed for unit-train service. But with older cars comprising unit trains, the capacity of each car is frequently less than 100 tons, about 70 tons. Other arrangements exist that are not strictly those of unit trains. For example, several small shippers can use a marshalling yard nearby to "assemble an all-coal train for movement to a single receiver." If, however, the coal from the small shippers is assembled at one point "with a centralized unit-loading facility and dedicated transportation equipment" to move to one large customer, it is considered by the railroads to be a unit train (28).

Unit trains haul several other commodities, even though coal accounts for more ton-miles of freight than does any other commodity. Railway Age reported in 1973 that "sulfur and sulfuric acid, coil steel and semiferrished steel, ore and taconite, wood products and other farm products, aggregates, limestone, potash, sludge, automobiles and parts, trailers, and containers" and such other commodities as fertilizer, petroleum products, "and municipal wastes of various descriptions" either move or are being considered for unit train movement (78).

NONRAILROAD CAR OWNERSHIP

Another special feature of unit trains is that many of the cars are owned or leased by shippers and receivers. This is especially true with coal. Most coal cars have traditionally been owned by the railroads, usually by the large coal-hauling roads, such as the Penn Central, the Chessie System, the Norfolk and Western, and the Illinois Central Gulf. Private car ownership is not a new development, in a strict sense, as special refrigerated fruit cars, tank cars, and other special-purpose cars have been in service for years. But this had not been a common practice in the coal industry.

Currently, however, large numbers of cars are owned by such electric power firms as Detroit Edison, Commonwealth Edison, and American Electric Power. In fact American Electric Power announced in its 1973 Annual Report that "2,000 new railroad cars" of 100-ton capacity are "scheduled for delivery over a period ending late 1975" (1). Even Potomac Electric Power Company, a much smaller firm with headquarters in Washington, D.C., "has ordered two unit trains consisting of 80 new coal cars each," the first train to be delivered in October 1974 and the other in March 1975 (51). The 1973 Rand McNally Railroad Atlas shows that Pennsylvania Power and Light owns 682 cars and Detroit Edison owns 630 (59).

Leasing cars is also a common practice in unit train service. Large companies such as Consolidation Coal and Peabody Coal both lease and own cars servicing their mines. But several of the electric power companies are both the largest leasers and owners. The 1973 Rand McNally Railroad Atlas also shows several car-leasing firms that own coal and other special-purpose cars, among them the Greenlease Company, a Division of Greenville Steel Car Company, with a total of 2,855 cars in 1973. The largest number of cars, 63,210, was owned by the Trailer Train Company.

Owning or leasing cars for unit train service offers certain distinct advantages compared with depending upon the railroads to supply the cars. One analyst cited the following advantages:

1. Cars are less likely to be diverted to other uses in times of emergency or extreme car shortage.

2. The mine is assured of being able to load cars previously loaded with coal, thereby eliminating a major cleaning problem.

3. Cars can be designed for the specific service.

4. Ownership of the cars can be a factor in negotiating long-term contracts for coal at a delivered price (30).

Freight rates are lower for coal moving in cars owned or leased by the coal or power companies than when the cars are supplied by the railroads. Problems associated with car supply, as well as other special features so important to large-volume movements, have made car ownership and leasing increasingly attractive. The practice will undoubtedly continue and expand as shipments of western coal increase.

UNIT TRAIN FREIGHT RATES

Freight charges for unit train service are quite different from the traditional coal rate structures "made on an origin group and destination basis" (34). Rates for unit trains are individually negotiated and have no fixed relationship to those applicable to other origin or destination points. When the rates were first negotiated, some relationship seems to have existed between single-car and multiple-car shipments. One example of this is the reference in 1959 to Lake Cargo rates from Illinois, Indiana, and western Kentucky fields that range "from 80.1 to 87.8 percent of the corresponding single-car rate" (38). But, as a general rule, no such relationship exists among the current unit train rates. In fact, unit train rates are now in effect for coal moving from the western mines to markets in the Midwest over routes where no effective single-car rates had formerly existed. For such routes, the unit train rates were the first coal rates actually published.

This new variety of rates typically specifies a minimum trainload and and annual minimum tonnage, along with the rate per ton from the point of origin to a designated destination. Table 4 has representative rates from western mines to plants farther west and in the Midwest. The territory through which the traffic flows and the length of distances covered influence the levels of the rates charged. Large-volume shipments in terms of trainloads and annual tonnages that move over relatively level or otherwise favorable territory are likely to have the lowest rate per ton-mile. This is consistent with rates noted in table 4, such as from Colstrip to Cohasset and from York Canyon to Kaiser.

One major constraint is that the rates must not require a designated portion of a shipper's freight to be a part of the negotiated agreement. This was confirmed in a case that involved the shipment of carpeting from Amsterdam, N.Y., with the lower rates conditioned upon agreement "by the shipper during the year of at least 80 percent of its traffic from and to those points." The Commission ruled that "the proposed rate was unjust and unreasonable in that it constituted a destructive competitive practice" (29, 35). In 1964 a decision involving unit train coal rates noted that the particular rates in question did not create "contract rates such as the Commission has condemned" in the disallowed rates on carpeting (36).

TABLE 4. - Representative unit train rates, all rail, from mines in Montana, New Mexico, and Wyoming

Origin and destination	Effective date	Minimum trainload, tons	Annual minimum tonnage	Rate per ton	Distance, miles	Cost per ton-mile, mills
Colstrip, Mont., to Cohasset, Minn.	8/13/73	10,200	1,000,000	$3.69	773	4.8
			1,500,000	3.45		4.5
			1,750,000	3.23		4.2
Kleenburn, Wyo., to St. Paul, Minn.	8/13/73	5,300	200,000	6.09	1,105	5.5
Colstrip, Mont., to Wautegan, Ill.	1/22/73	10,000	450,000 (one destination)	8.38	1,250	6.7
			900,000 (two destinations)	8.60	1,273	6.8
Decker, Mont., to Havana, Ill.	7/1/73	9,700	3,300,000	8.62	1,168	7.4
Belle Ayr, Wyo., to Pueblo, Colo.	6/18/73	10,500	1,670,000	3.10	600	5.2
York Canyon, N.M., to Kaiser, Calif.	1/2/74	8,400	500,000	7.91	1,069	7.4
			700,000	6.91		6.5
			over 700,000	5.91		5.5

Source: Marketing Dept., Burlington Northern, Inc.

The Commission made a pointed distinction between minimum annual volumes, even when these constitute a significant portion of the output, and minimum percentages of the total amount to be shipped. The minimum percentage was ruled to be a "destructive competitive practice" that might "substantially lessen competition or tend to create a monopoly." The minimum loads and minimum tonnages do not restrict other shipments, provided total output from the mine is above the minima or could be increased above them.

SPECIAL FEATURES OF UNIT TRAINS

A paramount appeal of unit train service is that it is much more efficient in terms of equipment utilization than is conventional rail freight service. Railroads had been subject to much criticism over a long period of time for failure to devote greater attention toward better utilization of their rolling stock. Isolated incidents and circumstances might yet justify criticism, but the general pattern is far from one of widespread disinterest. The Association of American Railroads in its July 1974 quarterly report on operations filed with the Interstate Commerce Commission noted that "freight car utilization is at an all-time high." In addition, this was the "ninth straight quarter in which car utilization has shown improvement over the corresponding period of the previous year." Increased freight levels were pointed out as one factor; but others of special note were the introduction of a "computerized national freight car information system in 1972, the rapidly expanding use of run-through trains and unit trains and other new methods of directing loaded and empty car movements." Since 1972 the average annual increase in net ton-miles per service-car-day has been 8.6 percent compared with a 2.6 percent increase in the 8 years from 1963 to 1971 (5).

The loading, line-haul movement, unloading, and return of unit trains are far different from anything experienced in rail service of earlier years. The cars are loaded while in motion and controlled by "two-way radio communication between the loading station and the train engineer." In this way, the operator can "start, stop, and control the speeds of all conveyors." The unloading process is equally well controlled with some of the operations averaging "one minute for each 10 cars in the train" (50). Weighing is also computerized with "an automatic car identification system" that records the car numbers, gross and net weight, type of coal, and "transmits this information to the shipper and to the servicing railroad" (41).

The report to the Secretary of Transportation on Rail Service in the Midwest and Northeast Region, submitted early in 1974, has a pointed comment on the "excessive amount of time freight cars are idle" (71). Another report to the National Council of Productivity and the Council of Economic Advisors stated that the "average load-to-load cycle time for freight cars in 1971...was 25.5 days" and that, on the average, 34.4 percent of the "car cycle time, or 8.8 days, is spent with car loaded and under carrier control." In addition, the "average loaded car moved 653 miles [in the 8.8 days] for an overall average delivery speed of 3.1 miles per hour, about walking speed" (48). Another assessment is that "freight cars spend 12 percent of their time in line-haul movement" with 40 percent in "loading and unloading and nearly half either awaiting movement or sitting idle" (66).

This is vastly different from Burlington Northern's 200-car unit train moving taconite in Minnesota. Each train hauls 15,000 tons, 75 tons per car, and makes the 230-mile round trip in 13 to 14 hours, including loading and unloading time. As the train reaches its destination, it "proceeds to a receiving station where the pellets are automatically dumped...two loads at a time...40 cars per hour." Their coal carrying unit trains are equally impressive. As an illustration,. moving at a constant speed of one-half mile per hour with the engineer able to dial the proper speed on a control attached to an instrument governing the speed of the locomotive. "A track scale weighs each car after it is loaded and the train is on its way." Upon arrival at the power station about 9 hours later, the train enters a large loop of track, and the coal is dumped as the cars pass over a pit. In slightly more than 3 hours, the entire train is unloaded and heading back to the mine. "A complete cycle takes about 25 hours" (10).

Instead of 40 percent of train time involved in loading and unloading, the modern unit train, under rigidly controlled conditions, can be loaded or unloaded within 3 to 4 hours with virtually no idle time. As a consequence, line-haul operations consume a major portion of the operating time, compared with an earlier average of 12 percent. Coal cars formerly loaded on an average of twice each month are being replaced by unit trains that are loaded as often as every second or third day, depending upon the distance traveled. Because of this, the annual ton-miles are much higher for unit trains and for other multiple-car and run-through trains than for cars operating under older coal traffic patterns. The Burlington Northern estimates this "has cut the cost of coal to the utility by more than 50 percent" (10).

Modern, computerized yard operations, along with avoiding classification yards, have improved rail service in a variety of operations. The "run-through" train can haul several different commodities, not necessarily bound for a single destination and has some of the more important features of unit trains.

CAR SHORTAGE

To evaluate the extent and nature of the freight car shortage is a seriously difficult task. To the shipper who has experienced long delay in getting his product moved to market, the shortage is very real indeed, with further study and careful analysis signaling only delay and additional, as well as useless, confusion. To the railroad that had idle cars during much of the year with no annual increase in freight hauled, or possibly a small decrease in tonnage and carloadings, a temporary shortage causing some delay does not seem unreasonable. To avoid such delay would require highly sophisticated planning and control of car usage as well as a much greater number of cars. A sufficiently large number would inevitably lead to excess capacity throughout most of the year with all of the cost increases associated with excess capacity. Greater sophistication in scheduling the use of cars is occurring, though not as rapidly or as soon as some have advocated and thought should have been accomplished.

To complicate the issue further, financial conditions of several of the largest railroads have been far from satisfactory, based on any reasonable standard of comparison. A realistic appraisal of the problems faced by the Nation's railroads was noted in Business Week in June 1974 (13):

> Lines like the bankrupt Penn Central are literally falling apart...Even the prosperous and well-maintained roads like the Santa Fe and the Southern face a huge need for investment...The roads as a whole are currently handling the biggest freight volume in history. Yet in the 12 months ended in March 1974, they earned a dismal 2.94 percent of their net investment.

This can hardly be viewed as an encouraging set of circumstances and conditions to justify substantial investment increases. In addition, the rather dramatic increase in demand for freight service is of quite short duration, despite the fact that it gives definite appearance of continuing into the future. The total number of freight cars loaded in 1973 was only 4.7 percent higher than in 1972. For coal, which is the largest single source of carloadings, a decline of 1.5 percent occurred between 1972 and 1973. The only major commodity group with a dramatic increase in 1973 traffic was grain, which rose 23.6 percent because of the expansion in grain exports (7).

The Interstate Commerce Commission and Congressional committees were reported to be investigating the possibility of a "black market" in railroad freight cars. The allegation was that large grain companies have control over many cars that are not available to all shippers on an equal basis. The same account, however, reports that the Association of American Railroads contends that "with the 1974 grain harvest underway, the freight car situation is the best since 1972" (75).

There can be little doubt that the car shortage has been a cause of much concern. Specifically, in June 1974 the Interstate Commerce Commission directed the railroads to show cause within 60 days why they should not increase the freight car fleet by 69,609 and reduce the number of cars out of service by about 18,000. The Commission order specified the number of new cars to be ordered by each of 36 railroads (4). The railroad receiving the order to purchase the greatest number of cars is the Penn Central, with 35,850 cars of the combined total of nearly 70,000. The complicated circumstances of that railroad and other bankrupt lines of the East raise serious questions about the effectiveness of such a directive. Even the 4,971 specified for the Erie Lackawanna under current circumstances would be a great financial burden.

In spite of some very genuine financial difficulties, the railroads are ordering new cars. Orders alone, unfortunately, do not guarantee quick deliveries. The Association of American Railroads reported that more new and rebuilt cars were ordered in 1973 (106,077) than in any other year since 1955. In 1974 the number was 99,034. For both 1973 and 1974, the totals were more than double the 47,915 for 1972 (57). Viewing the car shortage and the capacity of the rail system to handle freight as demanded, the recent orders are probably as high as could be anticipated in a realistic sense. The capacity of the country to build new cars and the ability of the railroads to finance the additions to their fleets will continue to be matters of serious concern. Also, rapid expansion in car-building capacity should occur only after further study and analysis. Continued performance on a level comparable to that of late 1973 and 1974 could prove to be reasonably adequate within a relatively short time. To expect no car shortage at any period of any year, with all of the seasonal and year-to-year traffic variations, is probably unrealistic. To meet such a goal would require unduly high investment in railroad rolling stock. Furthermore, larger cars, better utilization of old and new cars, and the purchase and leasing of cars by both shipping and consuming firms, such as coal and electric generating companies, can be viewed as encouraging. Better utilization is unquestionably a desirable goal to be pursued vigorously.

Canada has also experienced serious car shortages, leading the Prime Minister to announce that a "crown corporation" will be established to "purchase and manage a reserve fleet of specialized freight cars for the shipment of grain, cattle, lumber, coal and other commodities." The cars are to "be purchased in sufficient number to ensure" that if there were to develop an "unusual demand for rail cars at any time during the year the cars will be available" (65).

The Canadian approach might be the most effective one for them, but problems associated with building additional cars in light of existing freight-car construction capacity and the various materials shortages are inescapable. In a country not having the high freight volumes of this country, a government-owned reserve fleet of cars possibly can be administered quite effectively and adequately. Yet, this is not a simple matter under any circumstances.

Another aspect of the ability of the railway system to cope with increasingly large annual freight tonnages, with larger cars, faster trains, and greater plant utilization in general is the condition of the tracks of both specific lines and of the entire national system. The Under Secretary of Transportation was quoted as estimating that "approximately 200,000 miles of track are not now maintained at acceptable levels" (20). Even though this figure should be viewed as having been drawn from a broader context, 200,000 miles is a very large number when compared with 201,300 miles of rail lines in the country and 328,000 miles of rail track, including multiple main tracks, yard tracks, and sidings owned by line-haul, switching, and terminal companies (7).

Some disagreement exists over the condition of some of the tracks over which 10,000 to 11,000 ton loads move at speeds expected of unit trains as they meet their schedules. Modern trains do require a quality of track and adequate maintenance much above that necessary for traditionally less-heavily loaded cars moving at much slower speeds. But representatives of the railroads are generally optimistic about meeting these conditions and point out operating records of the unit trains and other trains without a delay in shipments or seriously increased maintenance costs. Yet, a small number of freight train accidents have been reported in the news creating some doubt about the true causes of these accidents, with poor quality of the tracks being one possibility.

The question of rail capacity in the absence of much additional track mileage to handle larger tonnages has been much explored. A report from the Indiana Railroad Association in July 1973 concluded that the present coal hopper car fleet is "capable of moving annually approximately 420.0 million tons based on the assumption that 80 percent of the hopper car fleet is available for loading with an average turnaround time of 1.5 trips per month" (32). This estimate would seem to indicate adequate capacity when compared with the 290 million tons of coal actually moved by the railroads in 1973 (64). But even though the 420-million-ton capacity is far above the 290 million tons actually handled, shortages did occur and were very real to the shippers involved. Railway Age quoted the Vice President, Transportation of Consolidation Coal Company, who contends that coal cars "have been tight for us for a year...and the bankrupt railroads are a problem especially" (52).

Another reference to railroad traffic capacity is found in the February 1974 report to the Secretary of Transportation on Rail Service in the Midwest and Northeast Region. This report states that the entire system capacity increased after 1920 but has been unsuccessful in adjusting "operations and physical plant to market conditions" (71). Among the changes since 1920 has been a decline in bulk commodities as a portion of total freight, such as coal, that move mainly by rail and a rather dramatic increase in high-value processed goods that are well suited to road haulage. The long-term change in traffic pattern has caused a declining portion of total freight to move by rail and has tended to discourage the railroads from building up large fleets of modern freight cars as the total national economy has been expanding.

The report also analyzes the capacity of the railroads to handle increasing traffic loads. Reference is made to the "excessive amount of time freight cars are idle" and the "gap between today's train operations and what is possible." Estimates are that the mainline-capacity utilization to Chicago is 30 percent; to St. Louis, 25 percent; and through the Rocky Mountains, 45 percent. Some of the rail systems are single track over much of the mainlines and this has caused some concern about their ability to handle substantially increasing tonnages from the western coalfields. The report estimates the "capacity of a single track block system" to be 40 trains per day in both directions. For single track operations with Centralized Traffic Control signal systems, the "daily capacity is 60 trains" (71).

The capacity of the railroads to cope with substantially more western coal does not seem to be an unduly serious matter. The railroads can probably enlarge their capacity to handle larger amounts of coal as rapidly as their potential competitors can be constructed. New cars have to be produced under conditions of materials shortages and other capacity constraints. But transport systems, as well as all industry, face virtually the same kinds and degrees of material shortages. In addition, some problems exist when converting electric generating plants now depending upon other fuels so that they can burn greater quantities of coal. The same constraints apply to the installation of appropriate equipment to cope with large inflows of coal by unit train, barge, or slurry pipeline. Further inescapable problems are associated with political decisions related to licenses for mining in government-owned coalfields and administrative procedures and restrictions that might be instituted.

Western coal is well suited to unit train operations because of long hauls from highly productive mines with few interchanges among different rail lines and large volumes consumed by electric powerplants. The portion of Montana-Washington coal consumed in power generation in 1973 was 96.3 percent, and the portion from Wyoming was 93.6 percent (64). Coal from the western fields moves over terrain favorable to bulk rail traffic as much of the distance is relatively level. For example, coal originating at mines along the Burlington Northern system requires no interchange with other systems to Chicago, St. Louis, St. Paul, Dallas, and to a number of points in the Mississippi River Valley. This is not to imply that improvements in the western rail systems are unnecessary. But the basic requirements are there or can be met without having to endure long delays in meeting the conditions of high-standard service.

ADEQUACY OF THE RAIL SYSTEM

The railway network of this country was well established before the earliest years of the century. Some new mileage has been added; but in many of the years since 1900 more miles of track were taken out of service than were added. In fact, the number of rail-line miles has declined in each succeeding year since 1958. The number of miles in 1973 was about 2,000 less than in 1972. The total in 1929 was nearly 250,000 miles compared with slightly more than 201,000 in 1973 (7).

Interest in the western coal has naturally raised the question of sufficient rail line availability to move the coal from new mines. In the eastern fields new extensions or branches have been constructed as needed or justified by development of new traffic. These extensions, almost without exception, have been only a few miles in length. A current example is the 7-1/2-mile new line under construction during fall of 1974 by the Norfolk and Western to a mine in Pike County, Ky. This mine will provide three unit trainloads each week for a powerplant in North Carolina (58).

The needs of the western mines are quite different from those of the eastern mines, as the lines are not nearly so close together. However, figure 2 shows the coal reserves and rail lines in Colorado, Montana, Utah, and Wyoming and offers a reasonable pattern of where the railroads are located in relation to the coal reserves.

The Rand McNally Handy Railroad Atlas of the United States contains a more detailed pattern of the network and the names of the individual railroads serving each State. The Western States cover large land areas compared with those of the East. Consequently, rail mileages in each Western State, though appearing rather large, do not furnish equivalent coverage to comparable mileages in the Midwestern and Eastern States.

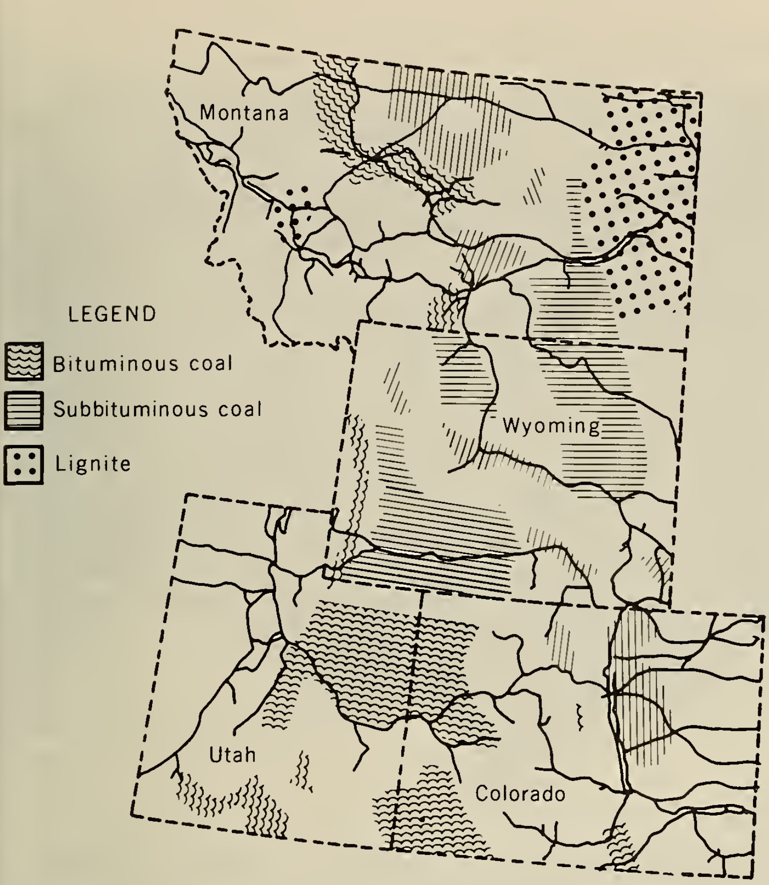

FIGURE 2. - Strippable reserves and existing railroad lines.

Colorado has a rail line mileage of 4,153; Montana, 5,084; and Wyoming, 1,971 (59). New lines are being planned and are under construction in the region. A new 105-mile line has been announced and will soon be underway in Wyoming. It is referred to as "the longest piece of railroad laid down in the United States since 1931." The new tracks will reach the Gillett coalfield with at least seven major mines scheduled to be opened. This is a joint project of the Chicago & North Western and the Burlington Northern (54).

PIPELINES

Slurry pipelines seem to be peculiarly well suited to long-distance, high-volume shipments from large mines to large consumers. One prediction is that lines up to 40 inches in diameter and 1,000 miles long will soon be under construction (76). Distances in excess of 1,000 miles are technically feasible as several hundred additional miles apparently will create no special problems. In fact, a 1,040-mile pipeline is proposed to run from the Powder River Basin in Wyoming to Arkansas (27).

Pipelines offer reliable service. An availability record of 98 percent was reported for the Ohio line during its full period of active operation, and that of the Black Mesa line was more than 99 percent during 1972 and the first half of 1973. Increased interest in energy conservation probably will stimulate increased interest in pipelines for coal and for a limited number of other solids (77). Figure 3 indicates operating and proposed coal slurry pipelines under active consideration.

Where existing rail lines are remote from new mines in fields of extensive deposits assuring significant traffic over a period of several years, pipelines will be actively considered. With existing technology, these lines can often be laid along nearly straightline routes which have not been typical of rail lines, most of which were constructed prior to 1900. New pipelines can probably be constructed following less circuitous routes than even new railroads.

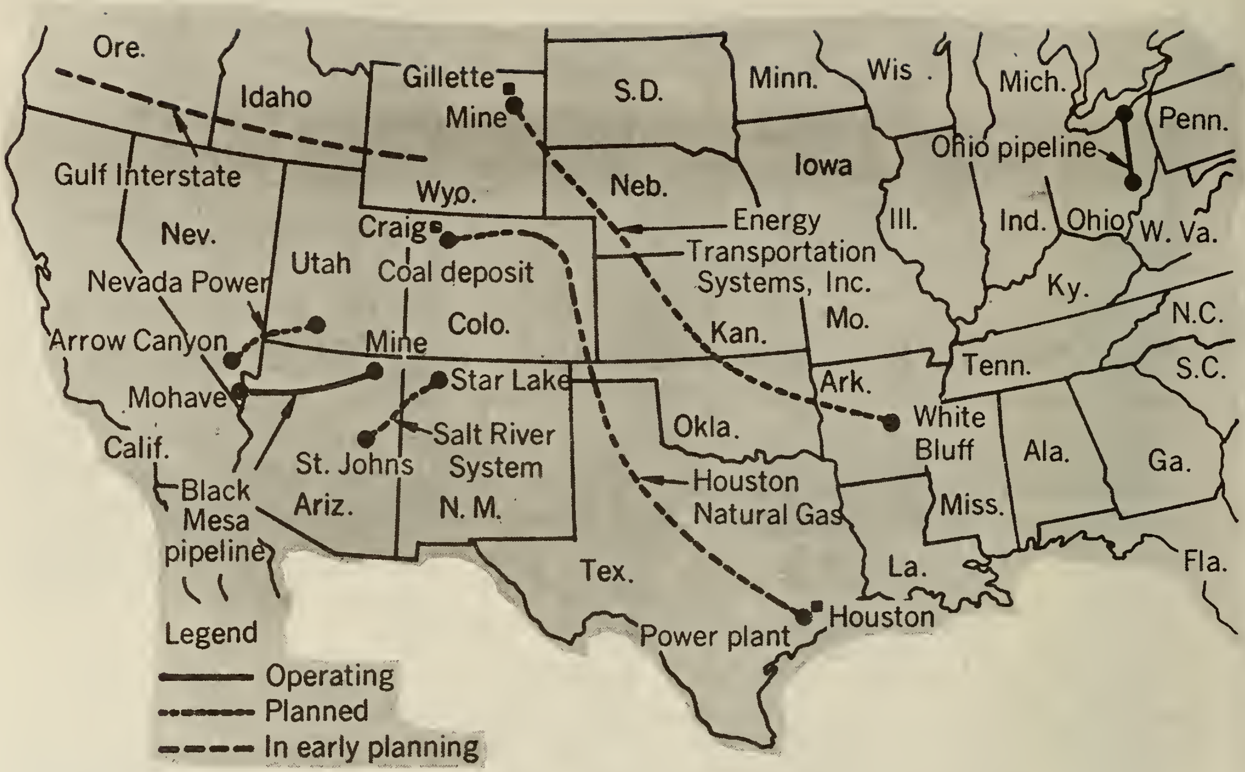

FIGURE 3. - Coal slurry pipeline. (Reprinted from July 15, 1974, issue of Electrical World, Copyright 1974, McGraw Hill, Inc. All rights reserved.)

One possible constraint in large-scale pipeline construction from western fields is that of water supply. Much of the area is arid and additional water consumption on a continuous year-round basis could be serious (9, 61). This must be studied more thoroughly before any definitive conclusion should be reached.

In any event, sufficient interest has been stimulated in proposed new slurry lines to raise again the legal matter of the right of eminent domain at the Federal level (proposed Amendment No. 1175 to Senate Bill S2652). In August 1974 the Senate Interior Committee approved a bill to grant the right of eminent domain to coal pipelines. To exercise this right, a certificate of public convenience and necessity would have had to be obtained from the Federal Power Commission after having conferred "with the Department of Interior, the Federal Energy Administration, the Environmental Protection Agency, and other Federal agencies." A similar bill was introduced in the House of Representatives. However, the bill which actually received Senate approval specified that the certificate was to be granted by the Interstate Commerce Commission. With only Senate approval, the bill has not been enacted into law at this time.

This same issue arose but was not resolved early in the 1960's with regard to the proposed line from the Appalachian fields to the east coast. Presumably, this must be settled prior to construction of a new line between

Wyoming and Arkansas. Again the railroads opposed Federal intervention, maintaining that control over "the right of eminent domain has traditionally rested with the states" (3, 6, 21). No doubt, the railroad strategy will be to oppose each request at the State level with a belief that they can block new lines more effectively on a State-by-State basis than at the Federal Government level. A spokesman for the proposed line from Wyoming to the Southern States was recently quoted as having said the slurry line would "have to cross rail lines in 44 places" and that the railroads have "already told us to forget it" (12).

COMPARISON OF UNIT TRAIN AND SLURRY PIPELINE COSTS

The available evidence does not support precise comparisons of transport costs of coal in a wide range of volumes and regularity of shipment to an even wider variety of destinations. Yet, much is known and will be crucial for background in efforts to reach decisions if the mines of this country are to provide the quantities of coal suggested in serious estimates. Production forecasts for the next two decades indicate increases in the Northern Great Plains of two to three times the 1973 level by 1977 to 1980, to be followed by further growth thoughout the decade beginning in 1980. This forecast is considered to be responsible, realistic, and even conservative (70). Expanded output seems assured in all major fields, though less dramatic in some fields compared with the western fields.

In view of the virtually certain rise in demand for coal transport service, extensive and important investment decisions have to be made. While the magnitude of the new investment requirements cannot be measured in precise terms, it should be clear that the task is large and will continue over a period of at least one to two decades. To rush into massive pipeline construction, rail car, or rail track rebuilding and expansion programs would be inadvisable in light of the material shortages in this country and throughout the world. But transport capacity must be available as output from the mines increases. Some of the decisions must necessarily carry long-run commitments of huge investments for that is the very nature of pipeline and rail operating equipment. This need is well illustrated by the following comment by the Chessie System President: "Those who mine the coal and we who transport it must be assured we are dealing with a long-term situation." It is not realistic to "purchase coal cars at $20,000 each to meet short-term emergency needs" (53).

Studies clearly indicate that long-distance pipeline and rail shipments of coal are both feasible in a comparative cost sense. Therefore, both are viable possibilities, especially for western coal where new mines will typically support large-volume movements. Although about 15 percent of the coal tonnage moves on inland and coastal waterways, this traffic is limited to that originating from mines adjacent to existing waterways. The ton-mile cost of water traffic is typically lower than rail costs for the same service. One helpful comparison of costs among alternative coal shipments made in 1971 is shown in table 5. Clearly the two low-cost methods are slurry pipeline and rail. The overlap of 0.3 to 0.7 cent per ton-mile for slurry and 0.4 to 0.9 cent for rail is realistic. Neither is superior to the other in any broad spectrum. Yet, for specific cases, one will undoubtedly be preferable to the other though likely by narrow margins. Therefore, analysis of the specific circumstances based on the best current information is inescapably the wisest course. A decision in one instance at one point in time can become only a matter of background for other decisions at later times. A more precise and later comparison than that of table 5 was published in December 1973. This one is based on a 1-trillion-Btu transport cost movement over a 1,000-mile distance. The rail distance is assumed to be 10 percent greater than for pipeline. The distance differential seems realistic in light of other studies The comparison is shown in table 6. The Project Independence Report of November 1974 concluded that slurry pipelines with capacities as high as 10 million tons per year "offer rate advantages over rail and are competitive" with barges (24). Oil transport costs are low compared with any known method of moving coal. Even the cost of transporting oil from the Middle East to world markets is estimated to be only 5 percent of the destination price as of April 1974 (43). Coal transport costs by rail declined to 36 percent of final per ton value in 1971 from 46 percent in 1967. This decline was due to both the increased unit train movement and to the rising coal prices (42).

TABLE 5. - Cost comparisons for solid volumes of 2 million to 6 million tons per year

Carrier	Transport costs, cents per ton-mile	Conditions
Slurry pipeline	0.3 to 0.7	Over 50 miles.
Rail...........	.4 to .9	Unit train, over 400 miles.
Truck..........	5.0 to 8.0	One-way haul, empty return.
Conveyor belt..	2.0 to 6.0	Less than 15 miles.

Source: Chemical Engineering, June 28, 1971, pp. 74-90.

TABLE 6. - Transport costs[1]

Fuel	Cents/MM Btu/day 100 miles
Oil......................	0.8
Gas......................	2.0
Coal slurry..............	2.4
Railroads (0.6 cent per ton-mile plus 10 percent greater distance).......	4.0

[1] Transportation costs are presented for various 1-trillion-Btu-per-day movements over a distance of 1,000 miles.

Source: Oil and Gas Journal, Dec. 24, 1973, pp. 44-50.

An interesting economic evaluation has been prepared by the Federal Bureau of Mines Process Evaluation Group, Morgantown, W. Va., on a possible slurry pipeline from Montana to the Northwest. Comparisons are made on volumes of 9.1 million and 18.2 million tons per year. The cost estimates are within a reasonable range of meeting rail costs between the same points. Although no substantial tonnage moves over this route, the Burlington Northern has tracks along the general route studied in this report.

Another study stresses the manner in which pipeline costs decline with large volumes, with an upward volume range to 25 million tons per year compared with 3 million tons which can be considered a representative amount that can be moved by a unit train within a year. The study estimates that the "cost per hundred miles is 2.5 cents per million Btu for a unit train transporting 3 million tons per year of coal versus 3.8 cents per million Btu for a slurry pipeline carrying 5 million tons per year." But having the volume reach 25 million tons "by pipeline will drop costs to 1.3 cents per million Btu" (18).

Should this general comparison prove to be realistic, pipelines can be expected for very large shipments, with the railroads continuing to dominate the field for large but not huge volumes. The 25 million tons will be shipped only to a few points since there are only a few receivers who can cope with such large amounts. With further study and experience, large lines might deliver to more than one destination without having to add unduly to their unit cost of service. The Process Evaluation Group study on the Montana-Northwest pipeline indicates that this is possible. The ton-mile costs are closely comparable to the $10.35 per ton for rail haulage of coal from the Great Plains to Seattle reported in the Project Independence Blueprint (70).

SUMMARY AND CONCLUSION

Should the question of eminent domain not be settled in a manner that permits interstate pipelines to be constructed, slurry pipeline service will be restricted to those cases for which approval can be obtained from two or more States. Most of the proposed new pipelines are to cross several States. Since the technology of pipeline transport has been sufficiently well demonstrated to prove that it will work, the necessary legislation may well be enacted.

Problems related to water supply could be a more serious impediment than those related to the right of eminent domain. For large pipelines in regions of low rainfall, water requirements must be considered along with other claims on the water supply. A small number of large lines might well be preferable to a larger number of smaller lines from the western coalfields to power-generating plants throughout the country. When the legal hurdles related to the right of eminent domain and environmental requirements for mining and reclamation are overcome, means probably will be found to provide water supplies adequate for effective operations.

Some question has arisen over the interest of the railroads in developing coal traffic from the western fields. This concern seems to be unjustified. Such companies as the Burlington Northern, the Denver & Rio Grande Western, the Chicago & North Western, the Union Pacific, the Southern Pacific, and the Missouri Pacific have demonstrated more than mere token interest. In fact, the Union Pacific had 1,000 open-top hopper cars on order at the end of 1973; the Southern Pacific, 700; and the Burlington Northern, 680 (42).

One of the more attractive features of the western coal traffic and the potential competition for this service is that the railroads would be encouraged to greatly improve their equipment utilization as is being done with the unit trains. More efficient utilization of existing and recently purchased equipment is preferable to merely adding new equipment to be used under older scheduling and utilization patterns. Innovations in rail operations, though rare for many years, have again occurred through unit trains rates and service.

In conclusion, the slurry pipelines and the unit trains offer possibilities for high-quality service that has been limited for many years. The need for one, and very likely for both, of these services on an increasing scale seems assured.

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